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## UTAH FLORA: BRASSICACEAE (CRUCIFERAE)

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**ABSTRACT.**— The mustard family, Brassicaceae (Cruciferae) is revised for the state of Utah. Treated are 155 species and 44 varieties, including 37 species of introduced weeds or escaped cultivated plants. A key to the genera and species is included, along with detailed descriptions, distribution data, and pertinent comments for many of the taxa. Proposed new varieties are: *Lepidium montanum* Nutt. var. *stellae* Welsh & Reveal; *L. montanum* var. *neeseae* Welsh & Reveal; *Lesquerella hemiphysaria* Maguire var. *lucens* Welsh & Reveal; *Physaria acutifolia* Rydb. var. *purpurea* Welsh & Reveal; and, *Thelypodium sagittatum* (Nutt.) Endl. in Walp. var. *vernicularis* Welsh & Reveal. The following new combinations are made: *Arabis confinis* S. Wats. var. *interposita* (Greene) Welsh & Reveal; *Descurainia pinnata* (Walt.) Britt. var. *paysonii* (Detl.) Welsh & Reveal; *D. richardsonii* (Sweet) O. E. Schulz var. *brevipes* (Nutt.) Welsh & Reveal; *Draba asprella* Greene var. *zionensis* (C. L. Hitchc.) Welsh & Reveal; *Draba densifolia* Nutt. ex Torr. & Gray var. *daviesiae* (C. L. Hitchc.) Welsh & Reveal; *Lesquerella alpina* (Nutt.) S. Wats. var. *parvula* (Greene) Welsh & Reveal; *Lesquerella kingii* S. Wats. var. *parvifolia* (Maguire & Holmgren) Welsh & Reveal; *Rorippa islandica* (Oed.) Borbas var. *glabra* (O. E. Schulz) Welsh & Reveal; *Thelypodium divaricata* (Rollins) Welsh & Reveal; *Thelypodium integrifolium* (Nutt.) Endl. var. *affine* (Greene) Welsh & Reveal.

This paper, dealing with the Brassicaceae, is one of a series of proposed revisions which will result ultimately in a definitive treatment of the flora of Utah. Not since the work of Tidestrom (1925) has the family been treated in its entirety, although a partial treatment is to be found in the work by Welsh and Moore (1973). The family has not been neglected by monographers, however. That observation is supported by the numerous references listed following the generic descriptions in the taxonomic treatment.

The family is both large and taxonomically complex. In the present treatment, some 199 taxa are recognized as occurring (or probably occurring) in Utah.

There are 155 species and 44 varieties. Adventive weedy species and cultivated plants known to escape and persist constitute 37 species and two varieties. Thus, almost 20 percent of the taxa included are introduced. It is unlikely that any of the other large families of vascular plants in Utah, such as Asteraceae, Poaceae, Fabaceae, or Rosaceae will contain such a large proportion of weedy and adventive taxa.

Generic limits in this family are often difficult to define, and because of this well-known problem, some taxa have been shifted from one genus to another, or even among several genera, depending on the authority one chooses to follow. One author, Krause, writing in Sturm's *Flora von*

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*Deutschland* in 1902, proposed an inclusive genus, *Crucifera*, for plants treated in this paper as belonging to *Conringia*, *Diplotaxis*, *Erysimum*, *Brassica*, *Lepidium*, *Hesperis*, *Draba*, *Barbarea*, *Hutchinsia*, *Raphanus*, *Sisymbrium*, and *Thlaspi*. Such an approach is even more frustrating than treating taxa with obscure taxonomic limits; it is neither realistic nor is it practical.

In the Utah flora, problems of generic limits fall mainly within the purportedly primitive members of the family, such as *Streptanthus*, *Thelypodium*, *Thelypodopsis*, *Caulanthus*, *Chlorocrambe*, and *Sisymbrium*. The approach taken herein is somewhat conservative, as we have tended to accept the various genera which appear to be more or less distinct, not only in Utah, but in other western states as well. Even so, the species treated in *Caulanthus* do not appear to represent a natural group, and some species of *Thelypodopsis* appear to be more closely related to taxa in other genera, especially in *Thelypodium*, than they are to each other. The species in *Caulanthus* seem to show affinities to *Thelypodium*, *Thelypodopsis*, *Chlorocrambe*, and *Streptanthus*.

In large part, we have tended to follow the published opinions of Dr. Reed C. Rollins of Harvard University, long-time student of the family, but we feel that much more work is needed in ascertaining relationships and hope that students will investigate some of the more difficult elements in the future. Some solutions might be forthcoming from studies of fine structure in various morphological features of the species, especially those to be derived from pollen morphology, from a review of phytochemistry beyond that which has already been done, and from a detailed review of cytology of the troublesome genera.

Continued reliance upon floral and fruiting characteristics, features upon which taxa have been and are currently based, is a part of the problem of arriving at a realistic system of classification of genera. An entity represents the sum of its features; yet in the Brassicaceae, much emphasis, sometimes to the exclusion of other features, has been placed on features of flowers and fruit, and, until work is directed toward an attempt to

summarize all features, our understanding of the genera in this family will remain confused.

Genera and species, in the present treatment, are arranged alphabetically. The key to genera is divided into seven different, morphologically based subkeys. These artificial subkeys provide leads to groups of species or individual taxa within the various genera.

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#### BRASSICACEAE Burnett

##### Mustard Family

Annual to perennial herbs or rarely suffrutescent, often with a pungent watery juice, glabrous to pubescent with simple or more commonly branched to stellate hairs, often glaucous; leaves alternate or basal and still alternate, entire or lobed, simple to compound, exstipulate, the cauline leaves usually sessile and auriculate; flowers perfect, regular or nearly so, hypogynous, borne in ebracteate or rarely bracteate racemes, spikes, or corymbs, rarely solitary and terminal on leafless scapes; sepals 4, erect to somewhat spreading, greenish to colored, the outer 2 often somewhat bulged or saccate at the base; petals 4, rarely lacking, yellow, white, or pink to blue or purple, commonly clawed, the blade rounded to occasionally bilobed and spreading in the form of a cross (hence *Cruciferae*); stamens 6 with the outer 2 inserted lower and shorter than the other 4 (tetradynamous), rarely 4 or 2; nectar glands commonly 4; ovary superior, 2-loculed or, less commonly, only 1-loculed, usually with a



thin partition (replum) between the two marginal placentae from which, when mature, the valves usually separate, the stigma rather small, entire to shallowly 2-lobed; fruit usually nonstipitate but occasionally so with a slender stipe, typically dehiscent or if indehiscent then constricted between the seeds (torulose) and sometimes breaking transversely, several times longer than broad (silique) to much shorter and not more than 2 or 3 times as long as broad (silicle), the sides flattened or compressed parallel with

the replum or, less commonly, flattened contrary to the replum; seeds (1) 2 to several in a single row per locule (uniseriate) or more or less distinctly arranged in 2 rows (biseriate), smooth to striate or pitted and plump to flattened or even wing margined, exalbuminous.

A large, worldwide family of perhaps 375 genera and 3000 species, with many plants of economic value as ornamentals, important vegetables, or noxious weeds.

- 1. Plants with cauline leaves both sessile and auriculate (at least some), or auriculate and petiolate (in some *Barbarea*, *Nasturtium*, and *Rorippa*) ..... 2  
Plants without cauline leaves or with cauline leaves not auriculate and sessile, either petioled or merely sessile ..... 4
- 2(1). Petals yellow; plants glabrous or with simple hairs, rarely with some malpighian hairs in *Thelypodopsis* ..... Key I  
Petals white, pink, lavender, chestnut, or purple, but not yellow (cream colored in *Camelina* and *Arabis*); plants glabrous or variously pubescent ..... 3
- 3(2). Plants glabrous or with simple trichomes only ..... Key II  
Plants pubescent with at least some malpighian, branched, or stellate hairs ..... Key III
- 4(1). Petals yellow, sometimes fading white or pinkish to purplish ..... 5  
Petals white, pink, lavender, purple, or chestnut, but not yellow ..... 6
- 5(4). Plants glabrous or with simple hairs only ..... Key IV  
Plants pubescent with malpighian, branched, or stellate hairs ..... Key V
- 6(4). Plants glabrous or with simple hairs only ..... Key VI  
Plants pubescent with at least some malpighian, branched, or stellate hairs ..... Key VII

KEY I

Cauline leaves auriculate; petals yellow

- 1. Uppermost cauline leaves falsely perfoliate-clasping; basal leaves finely dissected, usually lacking at anthesis; seeds 2, one in each locule; silicles about as broad as long (*L. perfoliatum*) ..... *Lepidium*  
Uppermost cauline leaves various, but not perfoliate-clasping, more than twice as long as broad; basal leaves pinnatifid to dentate or subentire; seeds several to many, or reduced to one in *Isatis*; siliques or silicles more than twice as long as broad ..... 2
- 2(1). Cauline leaves lyrate-pinnatifid or falsely petiolate above the auriculate base ..... 3  
Cauline leaves entire, ovate to oblong or lanceolate, undulate or rarely toothed, sessile ..... 4

- 3(2). Styles (0.5) 1-2 mm long, abruptly contracted at the stigma; fruit 15 mm long or more, many times longer than broad; plants not rhizomatous ..... *Barbarea*  
Styles 0.5-0.8 (1.3) mm long, or if longer, then plants rhizomatous, tapering to the stigma; fruit less than 10 mm long (rarely longer), 1 to several times longer than broad ..... *Rorippa*
- 4(2). Cauline leaves hastately lobed; pedicels deflexed in fruit; silicles cuneate, winged-flattened 1-seeded, 1-loculed ..... *Isatis*  
Cauline leaves clasping-auriculate; pedicels spreading-ascending to ascending in fruit; siliques linear, not or only somewhat flattened, not winged, many-seeded, 2-loculed ..... 5
- 5(4). Cauline leaves broadly rounded to truncate apically, strictly entire, elliptic-oblong to lance-oblong ..... *Conringia*  
Cauline leaves rounded to acute apically, more or less dentate to entire, tapering from base to apex ..... 6
- 6(5). Plants biennial; weeds of cultivated or disturbed sites; basal leaves lyrate-pinnatifid (*B. campestris*) ..... *Brassica*  
Plants perennial or biennial, rarely annual; indigenous plants of clay soils; basal leaves dentate to entire ..... 7
- 7(6). Stamens exserted; siliques long-stipitate, the stipe 1-2 cm long or more (*S. viridiflora*) ..... *Stanleya*  
Stamens included; siliques sessile or only short-stipitate ..... *Thelypodopsis*

KEY II

Cauline leaves auriculate; petals white, pink, lavender,  
or chestnut; herbage glabrous or with simple trichomes only

1. Leaves pinnately compound or pinnatifid; plants aquatic, glabrous (or nearly so); flowers white ..... *Nasturtium*  
Leaves simple, entire or merely toothed; plants terrestrial; flowers white, pink, lavender, or chestnut ..... 2
- 2(1). Uppermost cauline leaves commonly rounded to emarginate or truncate apically, the lower ones dentate apically; flowers chestnut to brown-purple or purple; siliques 3-5 (6) mm broad ..... *Streptanthus*  
Uppermost cauline leaves attenuate to acute apically, the lower ones various but not apically dentate only; flowers white, pink, or lavender ..... 3
- 3(2). Plants annual or winter annual; pedicels recurved in fruit; fruit indehiscent, winged-flattened, 1-seeded, 1-loculed; restricted to Washington Co. .... *Thysanocarpus*  
Plants annual, biennial, or perennial; pedicels spreading-ascending to erect, rarely descending in some *Thlaspi*; fruit dehiscent or indehiscent in *Cardaria*, winged-flattened to subterete, 2 or more seeded; distribution various ..... 4
- 4(3). Limb of petal 4-6 (7) mm long; sepals mostly 4-7 mm long; siliques (at least some) more than 5 cm long ..... 5  
Limb of petal 2-3 mm long or less; sepals mostly 2-4 (7) mm long; siliques or silicles less than 5 cm long except in *Arabis* ..... 6

- 5(4). Petals obovate, constricted at the base, the claw broad; stigma expanded and deeply bilobed; plants of eastern Utah (*T. elegans*) ..... *Thelypodopsis*  
 Petals oblanceolate, tapering to a slender claw; stigma narrowed, not deeply bilobed; plants mostly of north-central and western Utah (*T. sagittatum*) ..... *Thelypodium*
- 6(4). Fruit 10-30 times longer than broad or more, linear or narrowly oblong in outline ..... 7  
 Fruit 1-4 times longer than broad or less, clavate to obcordate, ovate, or cordate-reniform in outline ..... 9
- 7(6). Pedicels mostly 8-12 mm long, erect or nearly so; plants of middle altitudes in mountains (*A. hirsuta*) ..... *Arabis*  
 Pedicels 2-7 mm long, spreading-ascending to descending; plants of low to moderate elevation ..... 8
- 8(7). Plants 10 dm tall or more, biennial, the basal leaves often withered at anthesis; cauline leaves numerous, somewhat hastately and acutely auriculed; known only from central northern Utah (*T. rollinsii*) ..... *Thelypodium*  
 Plants 4 dm tall or less, annual or winter annual, the basal leaves not withered at anthesis; cauline leaves few to several, cordate-auricled to merely sessile; known only from Washington Co. (*C. cooperi*) ..... *Caulanthus*
- 9(6). Seeds and ovules 3 to many per fruit, usually 2 or more in each locule; fruit conspicuously winged or more than twice as long as broad ..... *Thlaspi*  
 Seeds and ovules 2 per fruit, 1 in each locule; fruit not or only somewhat winged ..... 10
- 10(9). Fruit broader than long, indehiscent; upper cauline leaves ovate; racemes 2-5 cm long in fruit, numerous ..... *Cardaria*  
 Fruit longer than broad, dehiscent; upper cauline leaves lanceolate; racemes 5-10 cm long or more in fruit, few (*L. campestre*) ..... *Lepidium*

## KEY III

Cauline leaves auriculate; petals white, pink, or lavender,  
 (except in *Camelina* and *Arabis*); herbage pubescent  
 with malpighian, branched, or stellate hairs

1. Plants indigenous biennials or perennials of broad distribution in native plant communities; fruits siliques, several to many times longer than broad; flowers pink, lavender, or white (cream in *Arabis glabra*) ..... 2  
 Plants adventive annuals or winter annual of disturbed or cultivated places; fruits silicles, less than 3 times longer than broad; flowers usually white ..... 3
- 2(1). Plants pubescent with mixed simple, forked, and branched hairs; siliques subquadrangular; known only from the northern foothills of the Uinta Mts. .... *Halimolobos*  
 Plants variously pubescent but not as above nor of that distribution; siliques distinctly flattened ..... *Arabis*
- 3(1). Plants flowering in early springtime; siliques triangular-obcordate, compressed ..... *Capsella*  
 Plants flowering in late springtime and summer; siliques obovoid, terete or nearly so ..... *Camelina*

KEY IV

Cauline leaves sessile or petiolate, not auriculate, or if  
hastately lobed then petiolate; flowers yellow; herbage  
glabrous or with simple hairs only

1. Cauline leaves both hastately lobed and petiolate, the leaf-blades triangular-ovate or lanceolate, entire; plants mostly 8 dm tall or more; of middle elevations often in dense vegetation ..... *Chlorocrambe*  
Cauline leaves pinnatifid to entire, the leaf-blades not hastately lobed; plants low to tall, but if tall then seldom if ever of middle elevations in dense vegetation ..... 2
- 2(1). Leaves all simple and entire or sparingly toothed; plants perennial from a caudex ..... 3  
Leaves (at least some) pinnatifid or definitely and regularly toothed (or, if all entire, then plant not arising from a caudex); plants annual, biennial, or perennial, sometimes with a distinct caudex ..... 6
- 3(2). Plants low, less than 1 dm tall; cauline leaves lacking; silicles lanceolate in outline, 1-4 times longer than broad (*D. densifolia*) ..... *Draba*  
Plants 1-5 dm tall or more; cauline leaves present; silicles linear, many times longer than broad ..... 4
- 4(3). Stamens long-exserted from the flower; pedicels spreading; silicles long-stipitate on stipes 10-25 mm long or more ..... *Stanleya*  
Stamens not exserted beyond the flower; pedicels ascending to suberect; silicles sessile, subsessile, or on a short stipe less than 1 mm long ..... 5
- 5(4). Silicles 10-20 mm long, 2-3 mm wide; plants known only from Uintah Co. .... *Glaucocarpum*  
Silicles 25-65 mm long, 0.8-1.2 mm wide; plants widespread and often weedy ..... *Schoenocrambe*
- 6(2). Plants growing in mud, along beaches, or in or near streams; petals usually less than 3 mm long; silicles usually less than 12 mm long ..... *Rorippa*  
Plants seldom if ever in perennially moist sites; petals more than 4 mm long or silicles more than 12 mm long, or both ..... 7
- 7(6). Leaves glaucous, thickened; perennial herbs from an often woody caudex; stamens long-exserted; silicles long-stipitate on stipes 10-25 mm long ..... *Stanleya*  
Leaves not glaucous, or, if so, not especially thickened; annual, biennial, or perennial herbs without a distinct caudex (except *Schoenocrambe*); stamens not exserted; silicles not stipitate ..... 8
- 8(7). Plants perennial, rhizomatous, indigenous, of lower elevations in native plant communities ..... *Schoenocrambe*  
Plants annual or biennial, adventive, of disturbed or cultivated places ..... 9
- 9(8). Fruits dehiscent to the apex; pedicels spreading-ascending to ascending, or, if erect (as in *S. officinalis*), the petals only 3-4 mm long ..... *Sisymbrium*  
Fruits with long, indehiscent sterile apices; pedicels ascending, or, if appressed (as in *B. nigra*), the petals 5-8 mm long or more ..... 10
- 10(9). Plants mostly 2-5 dm tall; leaves mainly basal; fruiting racemes longer than the leafy stems; seeds biseriate ..... *Diplotaxis*

Plants mostly 4-10 dm tall or more; leaves basal and cauline; fruiting racemes shorter than the leafy stems; seeds uniseriate ..... *Brassica*

KEY V

Plants with cauline leaves sessile or petiolate or lacking;  
petals yellow; herbage pubescent with malpighian,  
branched, or stellate hairs

- 1. Leaves once to twice or rarely thrice pinnately dissected or compound;  
plants annual or winter annual ..... *Descurainia*  
Leaves simple and entire or merely toothed or lobed; plants annual, biennial, or perennial ..... 2
- 2(1). Cauline leaves lacking, all leaves basal ..... *Draba*  
Cauline leaves present, at least one, the basal leaves present or absent ..... 3
- 3(2). Plants pubescent with appressed, Y-shaped and/or malpighian hairs; siliques  
many times longer than broad ..... *Erysimum*  
Plants pubescent with branched, dendritic, or appressed stellate hairs;  
silicles from about as broad as long to about 5 times longer than broad ..... 4
- 4(3). Pubescence of branched or dendritic hairs, rarely with some stellate; silicles  
lance-ovate to oblong or elliptic, usually more than twice as long as broad  
..... *Draba*  
Pubescence of appressed stellate hairs only (except for *Alyssum saxatile*);  
silicles orbicular in outline or subglobose to bladderly inflated, not over  
twice as long as broad ..... 5
- 5(4). Silicles compressed, lens-shaped; plants annual ..... *Alyssum*  
Silicles either subglobose or greatly inflated and terete or didymous; plants  
annual, biennial, or perennial ..... 6
- 6(5). Basal leaf blades often exceeding 20 mm in width; silicles (excluding style)  
8-10 mm long or more, didymous and bladderly inflated, often  
cordate at the base ..... *Physaria*  
Basal leaf blades rarely up to 20 mm in width; silicles (excluding style) 3-6  
mm long, not didymous, seldom bladderly inflated, not cordate at the  
base ..... *Lesquerella*

KEY VI

Plants with cauline leaves sessile or petiolate or lacking;  
petals white, pink, lavender, purple, or chestnut;  
herbage glabrous or with simple hairs only

- 1. Herbage stipitate-glandular or glabrous and the plants scapose and with  
large flowers; plants either alpine perennials or winter annuals of low  
elevations ..... 2  
Herbage glabrous or simple hirsute; plants of various habits, habitats, and  
duration ..... 3
- 2(1). Plants scapose alpine perennials; leaves basal; petal blades 8-10 mm long or more;  
siliques flattened, dehiscent ..... *Parrya*  
Plants winter annuals; leaves cauline and basal; petal blades 2-4 mm long;  
siliques terete, indehiscent ..... *Chorispora*



- 3(1). Blades of cauline leaves hastately lobed, otherwise entire, triangular-ovate to triangular-lanceolate; plants 8-10 dm tall or more; siliques short-stipitate, the stipe 2-7 mm long ..... *Chlorocrambe*  
 Blades of cauline leaves, if any, not both hastately lobed and entire; plants low to tall; siliques or silicles subsessile or sessile on the pedicel (except in *Lunaria*) ..... 4
- 4(3). Plants dwarfed scapose perennials; leaves often less than 10 mm long; scapes often less than 10 cm tall ..... *Draba*  
 Plants caulescent, at least some leaves cauline; leaves mostly more than 10 mm long; stems usually over 10 cm tall ..... 5
- 5(4). Plants slender annuals, 1-2.5 dm tall; leaves entire or merely serrate (at least the cauline ones); fruits obovate in outline and several-seeded, or, if linear, less than 15 mm long ..... 6  
 Plants annual, biennial, or perennial, 1.5-10 dm tall or more; leaves variously toothed, lobed, or entire; fruits obovate in outline and 2-seeded, or lance-ovoid, or, if linear, mostly more than 15 mm long ..... 7
- 6(5). Petals 1.2 mm long or less; silicles obovate, compressed, 2-3 mm long .....  
 ..... *Hutchinsia*  
 Petals 2-2.9 mm long; siliques linear, terete, 9-14 mm long ..... *Arabidopsis*
- 7(5). Basal leaves long-petiolate, the blades oblong to lanceolate, mostly 10-30 (50) cm long or more; cauline leaves lance-oblong, irregularly crenate-serrate; petals white; silicles less than twice longer than broad, abortive; plants cultivated but escaping and often persistent ..... *Armoracia*  
 Basal leaves sessile, poorly developed, or if long-petiolate, the blades seldom as above, usually less than 10 cm long; cauline leaves not both lance-oblong and irregularly crenate-serrate; petals pink, white, or chestnut purple; fruit various; plants indigenous or cultivated ..... 8
- 8(7). Petal blades 8-12 mm long, pink to lavender; silicles more than 20 mm wide; styles 6-8 mm long; leaves cordate-ovate, irregularly toothed ..... *Lunaria*  
 Petal blades usually less than 8 mm long; silicles or siliques much less than 10 mm wide; styles less than 3 mm long; leaves various but not cordate-ovate (except in *Cardamine cordifolia*) ..... 9
- 9(8). Seeds and ovules 2, 1 in each locule; silicles obcordate, orbicular, or elliptic, usually about as long as broad ..... *Lepidium*  
 Seeds and ovules more than 2, usually more than 2 in each locule; silicles lance-oblong or siliques linear and 3 to many times longer than broad ..... 10
- 10(9). Plants annual, with thickened tuberous roots; flowers white or pink, the petal limb more than 5 mm long; siliques terete, indehiscent ..... *Raphanus*  
 Plants perennial, biennial, or, if annual, not from thickened roots; flowers variously colored, but if white or pink then the petal limb less than 5 mm long; siliques or silicles terete or flattened, dehiscent ..... 11
- 11(10). Cauline leaves ovate, cordate-ovate, or pinnately compound; flowers white; plants of moist sites ..... *Cardamine*  
 Cauline leaves pinnatifid or entire to subentire and linear to elliptic, but not as above; flowers white or brown-purple, lavender or with purple veins; plants of various habitats ..... 12
- 12(11). Flowers minute, less than 1.2 mm long; silicles lance-oblong, less than 10

- mm long; leaves lyrate-pinnatifid (*R. tenerrima*) ..... *Rorippa*  
 Flowers 2-6 mm long or more; siliques linear to oblong, much more than  
 10 mm long; leaves pinnatifid to toothed or entire ..... 13
- 13(12). Flowers subsessile, the pedicels less than 2 (4) mm long; leaves, at least  
 some, definitely pinnatifid; petals mostly brown-purple ..... *Caulanthus*  
 Flowers pedicellate, the pedicels usually over 2 mm long, or the leaves en-  
 tire; petals variously colored, but, if brown-purple, pedicels definitely  
 longer than 2 mm ..... 14
- 14(13). Plants annual; pedicels curved-descending; siliques compressed, the sutures  
 parallel, not torulose ..... *Streptanthella*  
 Plants biennial or perennial; pedicels spreading to spreading-ascending (de-  
 clined in *Thelypodium wrightii*); siliques with parallel sides or else  
 torulose ..... 15
- 15(14). Petals strongly purple-veined; leaves linear; plants from a caudex, known  
 only from Uintah Co. (*T. argillacea*) ..... *Thelypodopsis*  
 Petals not or seldom purple veined; leaves various; plants with or without  
 a caudex, of various distribution ..... 16
- 16(15). Plants erect biennials; basal rosette prominent, but usually withered at an-  
 thesis; pedicels spreading or declined; siliques torulose; flowers numerous  
 to very numerous ..... *Thelypodium*  
 Plants ascending to erect perennials; basal rosette not especially prominent;  
 pedicels spreading-ascending; siliques with parallel sides; flowers several  
 to many (*A. nuttallii*) ..... *Arabis*

## KEY VII

Plants with cauline leaves sessile, petiolate, or lacking;  
 petals white, pink, lavender, or purple; herbage pubescent  
 with malpighian, branched, or stellate hairs

1. Leaves pinnately lobed; herbage cinereous pubescent; plants of high eleva-  
 tions ..... *Smelowskia*  
 Leaves entire to serrate or sinuate-dentate; herbage green or glaucous (cin-  
 ereous in *Dithyrea*); plants of low to high elevations ..... 2
- 2(1). Plants scapose, the leaves basal, mostly less than 1 dm tall ..... *Draba*  
 Plants with at least some leaves cauline, often more than 1 dm tall ..... 3
- 3(2). Petal blades more than 6 mm long; sepals definitely saccate, 6-8 mm long;  
 cauline leaves sinuate-dentate; plants 5-10 dm tall or more, cultivated  
 and frequently escaping ..... *Hesperis*  
 Petal blades less than 6 mm long; sepals not especially saccate, 1-6 mm  
 long; cauline leaves entire or sinuate-dentate; plants (0.5) 1-4 dm tall, in-  
 digenous or adventive, not cultivated (except *Lobularia*) ..... 4
- 4(3). Styles (1.5) 2-3 mm long; ovaries appressed stellate pubescent, about twice  
 as long as broad, dehiscent; seeds several ..... *Berteroa*  
 Styles 0.2-1 (1.5) mm long; ovaries variously pubescent, but if appressed  
 stellate then much broader than long, dehiscent or indehiscent; seeds 1  
 to many ..... 5
- 5(4). Pedicels 5-21 mm long, spreading; silicles with stellate or dendritic pub-

- escence, more than twice as broad as long, 2-seeded ..... *Dithyrea*  
Pedicels less than 8 mm long or not spreading, or, if spreading, siliques or  
siliques not with stellate or dendritic hairs and broader than long; seeds  
1, 2, or more ..... 6
- 6(5). Petals minute, less than 2 mm long; seeds 1 or 2; fruit indehiscent; plants  
annual or winter annual ..... 7  
Petals mostly 2-10 mm long or more; seeds 2 to many; plants annual, bien-  
nial, or perennial ..... 8
- 7(6). Ovaries and fruit with dendritic pubescence; fruit ovoid, with a curved sty-  
lar beak up to 1 mm long, 2-seeded ..... *Euclidium*  
Ovaries and fruit with simple hairs; fruit orbicular, compressed, lacking a  
stylar beak, 1-seeded ..... *Athysanus*
- 8(6). Pedicels less than 2 mm long, appressed or ascending; leaves sinuate-den-  
tate; siliques ascending, 33-63 mm long, pubescent with dendritic or  
branched hairs, the stigma oblique ..... *Malcolmia*  
Pedicels 2-10 mm long, descending to spreading or ascending; siliques or si-  
liques various, sometimes pubescent with dendritic or branched hairs, the  
stigma terminal ..... 9
- 9(8). Pedicels descending; fruit pendulous, 13-65 mm long; plants perennial ..... *Arabis*  
Pedicels spreading to ascending; fruit erect or spreading-ascending, 2-14  
mm long; plants annual or perennial ..... 10
- 10(9). Leaves mainly cauline, strigose with malpighian hairs; fruit about as broad  
as long; seeds 2; plants cultivated and often escaping ..... *Lobularia*  
Leaves mainly basal, with stalked dendritic or stellate hairs; seeds usually  
more than 2; plants indigenous or adventive ..... 11
- 11(10). Fruit linear to narrowly oblong, terete or subterete, less than 1 mm broad;  
plants slender annuals ..... *Arabisopsis*  
Fruit lance-ovate to lanceolate or oblong in outline, flattened, 1.5-3 mm  
broad; plants annual or perennial ..... *Draba*

ALYSSUM L.

Plants stellate-pubescent annuals or pe-  
rennials from taproots; leaves alternate,  
simple, entire, tapering to base, not auricu-  
late; flowers in racemes, pedicels spreading-  
ascending to ascending or erect, not sub-  
tended by bracts; sepals 4, deciduous or  
persistent; petals 4, yellow (often fading

cream or white), emarginate; stamens 6, at  
least the two shorter filaments with a whit-  
ish process near base; style slender, stigma  
capitate; fruit a sessile silicle, less than  
twice longer than broad, broadly elliptic to  
oval in outline, compressed parallel to the  
septum, valves veinless; seeds 1 or 2 per lo-  
cule.

1. Cauline leaves, at least some, more than 4 cm long; flowers bright yellow,  
fading cream; petal blades obcordate, about as broad as long; plants  
perennial, cultivated and occasionally escaping ..... *A. saxatile*  
Cauline leaves less than 4 cm long; flowers pale yellow (fading white); pet-  
al blades cuneate, much longer than broad; plants adventive annuals of  
arid sites ..... 2
- 2(1). Silicles glabrous or essentially so, orbicular in outline; styles 0.5-0.8 mm  
long, persistent ..... *A. desertorum*

- Silicles stellate-pubescent, orbicular to elliptic in outline; styles various ..... 3
- 3(2). Silicles 4-5 mm broad; styles 0.8-1.2 mm long; pubescence of coarse spreading-ascending stellate hairs ..... *A. minus*  
 Silicles 2.8-4 mm broad; styles 0.3-0.6 mm long; pubescence of delicate appressed-stellate hairs ..... 4
- 4(3). Silicles emarginate at the style, about as broad as long; hairs of fruit minute, not or seldom overlapping ..... *A. alyssioides*  
 Silicles truncate at the style, longer than broad; hairs of fruit ample, usually overlapping ..... *A. szowitsianum*

*Alyssum alyssioides* (L.) L. (*Clypeola alyssioides* L.) Alyssum. Plants annual, stems ascending to erect, simple or branched from near base (3) 6-25 cm tall; leaves spatulate to oblanceolate, 5-20 (37) mm long, 2-6 mm broad, stellate and green on both surfaces; pedicels spreading-ascending, 1.5-4 (5) mm long; sepals 2.1-2.8 (3) mm long, green, stellate-pubescent, persistent; petals 3-4.2 mm long, yellow, fading white, cuneate, surpassing sepals; silicles 3-4 mm long and about as broad, valves minutely stellate-pubescent, emarginate at style; styles persistent, mostly 0.3-0.6 mm long. Foothills, roadways, and other dry sites at low elevations in Cache, Salt Lake, Tooele, Utah, and Wasatch counties, and to be expected elsewhere; widespread in North America; adventive from Europe.

*Alyssum desertorum* Stapf. Desert Alyssum. Plants annual, stems decumbent to ascending or erect, simple or branched from near the base, (3) 4-20 cm tall; leaves spatulate to oblanceolate or almost linear, 4-22 mm long, 2-3 mm wide, stellate and green on both surfaces; pedicels spreading-ascending, 1.8-2.5 mm long; sepals 1.2-1.9 mm long, often suffused with red, stellate-pubescent; petals 2.3-2.8 mm long, yellow, fading white, cuneate, surpassing sepals; silicles 2.9-3.8 mm long and about as broad, valves glabrous or rarely with scattered stellate hairs, emarginate at the style; styles persistent, 0.5-0.8 mm long. Foothills, roadsides, and other dry sites at low elevations in Morgan, Salt Lake, Sanpete, Tooele, Utah, and Weber counties, and to be expected elsewhere; Washington, Oregon, Idaho, and Montana; adventive from Asia Minor and adjacent southeastern Europe

(Rollins, R. C. 1941. Contr. Dudley Herb. 3: 183).

*Alyssum minus* (L.) Roth. (*Clypeola minor* L.). Plants annual, stems ascending to erect, simple or branched from near base, 0.9-2.5 dm tall; leaves spatulate to oblanceolate, 4-25 mm long, 2-7 mm broad, coarsely stellate and green on both surfaces; pedicels spreading-ascending, 2.8-4.9 mm long; sepals (1.5) 1.7-2.5 mm long, often suffused with red, stellate-pubescent, caducous; petals 2.7-3.6 mm long, yellow, fading white, surpassing sepals; silicles (3.5) 4-5.2 mm long and about as broad or broader, valves coarsely stellate with ascending rays, emarginate at style; styles persistent, 0.8-1.2 mm long. Foothills and roadsides in Salt Lake Co., and to be expected elsewhere; California and Colorado; adventive from the Old World.

*Alyssum saxatile* L. Sweet Alyssum. Annual, stems sprawling-decumbent to ascending or erect, branched from base and above, 20-35 cm tall; leaves oblanceolate to elliptic or oblong, 90-135 mm long, 2-17 mm wide, minutely stellate and with long, forked, and simple hairs, and green on both surfaces; pedicels spreading-ascending, 3.5-8 mm long; sepals 1.7-3 mm long, green or cream, loosely stellate to glabrate, caducous; petals 4-5 mm long, yellow, fading cream, much surpassing sepals; silicles 3.5-4.5 mm long or more and about as broad, valves glabrous, truncate to rounded at style; styles persistent, 0.5-1 mm long. Cultivated ornamental, occasionally escaping; introduced from southern Europe

*Alyssum szowitsianum* Fisch. & Meyer Szowits Alyssum. Plants annual, stems decumbent-ascending to erect, usually

branched from near base, 5-15 cm tall; leaves oblanceolate, 8-25 mm long, 1-5 mm broad, stellate and green or suffused with red on both surfaces; pedicels ascending to erect, 2.7-4.2 mm long; sepals 0.9-1.2 (2) mm long, often suffused with red, stellate-pubescent, caducous; petals 1.7-2 mm long, yellow, fading white, only slightly surpassing the sepals; silicles 4-5 (6) mm long, longer than broad, valves densely stellate, truncate at style; styles persistent, 0.5-0.6 mm long. Dry foothills, in Salt Lake County, and to be expected elsewhere; adventive from Europe.

ARABIDOPSIS (DC.) Schur

Plants annual, glabrous, or pubescent with simple or branched hairs, from tap-roots; leaves alternate or basal (and still alternate), simple, entire, or remotely serrate, tapering to base, not auriculate; flowers in racemes, pedicels spreading-ascending, not subtended by bracts; sepals 4, deciduous; petals 4, white, not emarginate; stamens 6, at least the two shorter filaments subtended by a semicircular gland; style very short, tapering, stigma not enlarged; silique sessile, several times longer than broad, subterete, valves with conspicuous mid-nerve; seeds several to many in each locule.

*Arabidopsis thaliana* (L.) Schur. Mouse-ear Cress. (*Arabis thaliana* L.). Plants slender annuals, stems erect or nearly so, usually branched throughout, 8-30 (40) cm tall; leaves mainly basal, spatulate to oblong, 3-30 (50) mm long, 2-8 mm broad, remotely toothed to subentire, pubescent with simple or 2- to 4 (5) -rayed hairs, green; cauline leaves much smaller than basal ones, lance-

oblong, sessile or nearly so, 5-20 mm long, 2-5 mm wide; pedicels very slender, 2.5-10 mm long; sepals 1.2-1.7 mm long, green to cream or reddish tinged, sparingly long-hairy; petals 2-2.9 mm long, white, spatulate, surpassing sepals; siliques 9-14 mm long, 0.5-0.8 mm broad, valves glabrous; styles 0.2-0.3 mm long. Dry hillsides at lower elevations in Salt Lake and Weber counties, and to be expected elsewhere; widespread in temperate North America; adventive from Europe.

ARABIS L.  
Rock-Cress

Plants biennial or perennial, glabrous or pubescent with simple, branched, or stellate hairs; leaves alternate and basal, simple, entire, dentate, serrate, or sinuate, tapering to base or cauline blades sessile and usually auriculate; flowers in racemes, the pedicels erect, ascending, spreading-ascending, spreading, descending, or reflexed, not subtended by bracts; sepals 4, deciduous; petals 4, white, pink, lavender, or purple (cream in *A. glabra*); stamens 6, at least the two shorter filaments subtended by glands; styles prominent to lacking, the stigmas entire to lobed; fruit a sessile or substipitate silique many times longer than broad, laterally flattened, valves usually with a midnerve; seeds numerous.

A large genus of perhaps 100 species of Eurasia and North America.

Rollins, R. C. 1941. Monographic study of *Arabis* in western North America. Rhodora 43: 289-325, 348-411, 425-481. Reprinted at Contr. Gray Herb. 138.

- 1. Cauline leaves usually attenuate to rounded basally, either petiolate or sessile but not auriculate (rarely so in *A. pendulina*) ..... 2
- Cauline leaves auriculate, at least some ..... 6
- 2(1). Petals 9-18.5 mm long; petal limb divaricate; ovary and silique densely pubescent; herbage pubescent with minute dendritic hairs ..... *A. pulchra*
- Petals (4.5) 5-8 (9) mm long; petal limb ascending to erect; ovary and silique glabrous or sparingly hairy only; herbage glabrous or with simple or branched hairs ..... 3
- 3(2). Pedicels spreading-ascending to erect; siliques ascending to erect ..... 4
- Pedicels divaricate to descending; siliques descending to pendulous ..... 5



- 4(3). Pedicels and siliques erect; siliques 3-6 cm long; plants wide-spread in northern and central Utah ..... *A. hirsuta*  
 Pedicels and siliques merely ascending; siliques 1-3 cm long; plants known only from Cache County ..... *A. nuttallii*
- 5(4). Seeds biseriate; siliques 2-3 mm broad; plants of central and southern Utah ..... *A. pendulina*  
 Seeds uniseriate; siliques 1.5-2 mm broad; plants of Daggett and Uintah counties ..... *A. demissa*
- 6(1). Lower leaves and/or stems pubescent exclusively with malpighian hairs (at least some); flowers white to pink; pedicels and siliques erect; plants widespread ..... *A. drummondii*  
 Lower leaves and/or stems glabrous or variously pubescent but not exclusively of malpighian hairs only, or, if so, otherwise various; flowers white, pink, lavender, or purple (cream in *A. glabra*); pedicels and siliques variously disposed but sometimes erect ..... 7
- 7(6). Basal leaves more or less hirsute and usually ciliate with long simple or forked hairs, not both hirsute and with dendritic hairs on the blade surfaces .... 8  
 Basal leaves more or less densely pubescent with dendritic (rarely malpighian) hairs, rarely also with a few long simple or forked hairs along the leaf bases ..... 11
- 8(7). Flowers cream to white or pinkish; pedicels and siliques ascending to erect ..... 9  
 Flowers pink to lavender or purple, rarely white; pedicels and siliques spreading to descending ..... 10
- 9(8). Stigmas expanded. 0.8-1.1 mm broad, much wider than the style base; outer sepals not gibbous at the base; petals cream to rarely pinkish; siliques not strongly compressed; plants from Utah County northward ..... *A. glabra*  
 Stigma not obviously expanded, 0.3-0.6 mm broad, not much wider than the style base; outer sepals gibbous at the base; petals white to pink; siliques definitely compressed; plants of a broader distribution ..... *A. hirsuta*
- 10(8). Stems solitary or few, 2.5-6 dm tall; cauline leaves 1-4 cm long; seeds biseriate ..... *A. fendleri*  
 Stems several to many, 1-3 dm tall; cauline leaves 0.5-1 cm long; seeds uniseriate ..... *A. demissa*
- 11(7). Fruiting pedicels (but not necessarily the siliques) ascending to erect; siliques erect to spreading or even curved-pendulous ..... 12  
 Fruiting pedicels spreading to descending, pendulous, or appressed downward along the axis of the raceme ..... 16
- 12(11). Leaves, stems, and pedicels (and sometimes even the siliques) hoary with minute soft hairs; plants of central western Utah ..... *A. shockleyi*  
 Leaves variously pubescent; stems and pedicels glabrous or puberulent, or the stems hairy near the base only; plants of various distributions ..... 13
- 13(12). Pedicels erect; siliques erect or steeply ascending; plants 0.5-2.5 dm tall, of alpine sites at high elevations ..... *A. lyallii*  
 Pedicels spreading-ascending to ascending; siliques spreading to more or less pendulous; plants (2) 2.5-5 dm tall or more, of moderate to low elevations ..... 14

14(13).	Stems usually solitary, 3-10 dm tall (usually pubescent with malpighian hairs); cauline leaves 10 or more, well developed, closely positioned, and often overlapping .....	<i>A. confinis</i>
	Stems usually more than one, 2.5-5 dm tall; cauline leaves usually fewer than 8, poorly developed, commonly widely spaced and only the lowermost overlapping .....	15
15(14).	Stems arising from between the basal rosette and a tuft of ascending leaves; basal leaves mostly 2.5-5 cm long or more .....	<i>A. selbyi</i>
	Stems arising from the basal rosette, a secondary tuft of leaves lacking or poorly developed; basal leaves mostly 0.5-2.5 cm long .....	<i>A. microphylla</i>
16(11).	Lowermost leaves entire, poorly developed, smaller than the main cauline ones; cauline leaves linear to narrowly oblong; siliques more or less finely pubescent .....	<i>A. pulchra</i>
	Lowermost leaves in a rosette, more or less well developed, usually oblanceolate to spatulate and broader than the main cauline ones, often toothed; siliques not or rarely pubescent (except in <i>A. puberula</i> ) .....	17
17(16).	Stems usually 3 or more, arising between basal rosette and an ascending-erect tuft of leaves; lowermost leaves more or less toothed; pedicels spreading-descending; siliques more or less pendulous .....	<i>A. perennans</i>
	Stems usually solitary, rarely 3 or more but then branches not arising from between a basal rosette and a tuft of ascending leaves, lowermost leaves entire or toothed .....	18
18(17).	Leaves, stems, pedicels and fruit densely pubescent with minute hairs; plants of north central and perhaps western Utah .....	<i>A. puberula</i>
	Leaves, stems and pedicels variously pubescent but seldom if ever all of them hairy at once .....	19
19(18).	Stems usually numerous, less than 2 dm tall; flowers bright pink to lavender or purple; plants of high elevations in Wasatch and Uinta mountains .....	<i>A. lemmonii</i>
	Stems usually solitary or, if more, over 3 dm tall; flowers pale pink to lavender or white; plants of lower to moderate elevations, not of alpine sites .....	20
20(19).	Petals 8-12 mm long or more; pedicels and siliques merely spreading; plants evidently rare in northern Utah .....	<i>A. sparsiflora</i>
	Petals 4-9 mm long; pedicels and siliques spreading-descending to reflexed .....	21
21(20).	Basal leaves thickish, usually entire; pedicels merely spreading-descending ... ..	<i>A. lignifera</i>
	Basal leaves thin, often sharply toothed; pedicels curved-decending to reflexed; our most common species .....	<i>A. holboellii</i>

*Arabis confinis* S. Wats. [*Turritis brachycarpa* Torr. & Gray; *A. drummondii* var. *brachycarpa* (Torr. & Gray) A. Gray; *A. confinis* var. *brachycarpa* (Torr. & Gray) Wats. & Coult.; *A. divaricata* A. Nels.; *A. brachycarpa* (Torr. & Gray) Britton, not Rupr.; *A. oblanceolata* Rydb.; *A. pratincola* Greene; *A. nemophila* Greene; *A. dactica* Greene; *A. brevisiliqua* Rydb.; *A. stokesiae* Rydb.; *A. drummondii* var. *pratincola* (Greene) Hopkins]. Plants biennial or short-lived perennial; stems (2.5) 3-9 (10) dm tall,

solitary, or, when more than one, not arising from between basal rosette and a tuft of ascending leaves; herbage subglabrous to puberulent with malpighian or 3- to several-rayed hairs at least on lower stems and leaves; basal leaves (1.3) 2-7 cm long, 0.3-0.9 cm wide, oblanceolate, subentire to dentate, usually acute; cauline leaves auriculate, numerous, mostly 2.2-6.5 cm long and 0.3-0.8 cm wide; pedicels 3-14 mm long, glabrous, spreading-ascending or even (rarely) descending; sepals 3-5 mm long, sparsely pubescent or glabrous; petals 6-10 mm long, pink to lavender, spatulate, erect or ascending; siliques 20-85 mm long, 1.5-2.5 mm wide, divaricate to subpendulous, valves glabrous, nerved to the middle or above; styles short or obsolete; seeds uni- or biseriate.—Moist sites at middle elevations in the mountains of Cache, Carbon, Garfield, Millard, Rich, Salt Lake, Sevier, Summit, Utah, Washington, Wayne, and Weber counties, and to be sought elsewhere; Alaska and southern Yukon east to the Atlantic and south to California and Colorado. Our material is var. *confinis*.

We are reluctantly taking up the name *Arabis confinis* for one of North America's more common species of the genus and placing the long-used name, *A. divaricarpa* A. Nels., in synonymy. The nomenclatural problems surrounding *A. confinis* were initially discussed by Fernald (*Rhodora* 5: 225-231. 1903) and reviewed again by Hopkins (*Rhodora* 39: 63-98, 106-148, 155-186. 1937) and Rollins (1941). Fernald correctly noted that Watson based his description on, and cited representative specimens of, two different kinds of *Arabi*, one being *A. drummondii* A. Gray, and the second *A. brachycarpa* (Torr. & Gray) Britton. What Fernald did not realize, apparently, was that the name *A. brachycarpa* had already been used by Ruprecht in an 1869 publication. Thus, Hopkins and Rollins took up the next available species name, *A. divaricarpa*, which was published by Nelson in 1900. Neither Hopkins nor Rollins attempted to typify the Watson name on one or the other of these elements (*A. drummondii* or *A. divaricarpa*) and simply placed *A. confinis* in synonymy under both.

We have reviewed the original Watson publication (*Proc. Amer. Acad. Arts* 22: 466. 1887) and have noted that under the current International Code, it is clear that Watson was proposing a new name for *Turritis brachycarpa* Torr. & Gray (not *Arabis brachycarpa* Rupr.), and, in spite of Watson's confused description and citation of specimens, one must accept *A. confinis* as a new name for *T. brachycarpa* and its type. Thus, *A. confinis* is the earliest available name for *T. brachycarpa*, and it is not a synonym of *A. drummondii* as proposed by Fernald, Hopkins, and Rollins.

In addition to var. *confinis*, there is also *Arabis confinis* var. *interposita* (Greene) Welsh and Reveal, comb. nov., based on *A. interposita* Greene, *Leaf. Bot. Observ.* 2: 78. 1910.

*Arabis demissa* Greene. [*A. rugocarpa* Osterh. *A. aprica* Osterh. ex Nels. in Coult. and Nels.] Plants perennial, stems 1-3 dm tall, solitary or 2-5 from a simple caudex, these arising from between the basal rosette and a tuft of ascending leaves, subglabrous to hirsute with simple or forked hairs at least below; basal leaves 1.5-3.5 cm long, 0.2-0.5 cm wide, narrowly to broadly oblanceolate, entire, hirsute marginally and often on surface with simple hairs; cauline leaves sessile and non-auriculate (except in var. *lanugida*), mostly 0.5-1 cm long and 0.1-0.4 cm wide, oblong to lanceolate, hirsute to glabrous; pedicels 3-7 mm long, glabrous, slender, arched downward; sepals 2-3.5 mm long, sparsely pubescent; petals 4.5-6.5 mm long, white to pink, spatulate, erect or ascending; siliques 20-40 mm long, 1.5-2 mm wide, pendulous, valves glabrous, nerved to about the middle; styles obsolete; seeds uniseriate.—Foothills and drainages in the Wasatch Plateau and eastern portion of the Uinta Mountains, Utah; southern Wyoming and central Colorado.

The species is closely allied to both *A. fendleri* and *A. pendulina*, differing from the former in smaller size of stems and leaves, from the latter in the more slender siliques, and from both of them in the uniseriate seeds.

1. Cauline leaves auriculate; basal leaves, at least the outer ones, oblanceolate ..... var. *lanugida*  
Cauline leaves merely sessile, not auriculate; basal leaves merely linear to  
narrowly oblanceolate ..... var. *russeola*

**Var. *lanugida*** Rollins. Low hills and drainages, sagebrush and juniper communities, at about 1500 to 1700 m elevation, Daggett and Emery counties; southern Wyoming.

**Var. *russeola*** Rollins. Low hills and valleys in juniper communities, at about 1700 m elevation, Daggett and Uintah counties; southern Wyoming.

These two variants are only weakly distinguishable and may not deserve separation. The var. *demissa* is restricted to the mountains of central Colorado.

***Arabis drummondii*** A. Gray. [*Turritis stricta* Graham, not *A. stricta* Huds.; *Streptanthus angustifolius* Nutt. ex Torr. & Gray, not *A. angustifolia* Lam.; *A. connexa* Greene; *A. oxyphylla* Greene; *A. albertina* Greene; *A. philonipha* A. Nels. ex Rydb.; *Turritis drummondii* (A. Gray) Lunell; *A. drummondii* var. *connexa* (Greene) Fern.; *A. drummondii* var. *oxyphylla* (Greene) Hopkins]. Plants biennial or short-lived perennial, the stems (0.8) 1.2-9 (9.7) dm tall, solitary or 2 to several from a simple or branched caudex, not arising from between basal rosette and tuft of ascending leaves, usually glabrous throughout or strigose with malpighian hairs at base only; basal leaves (1.1) 1.5-7 (8) cm long, 0.2-1.2 cm wide, oblanceolate, entire, subglabrous or pubescent with malpighian hairs; cauline leaves usually longer than internodes, numerous, (1) 1.5-6 cm long, 0.2-1.5 cm wide, oblong to lanceolate, usually entire, sessile and auriculate, usually glabrous; pedicels 7-15 mm long in fruit, erect, glabrous; sepals (3) 3.3-5.7 mm long, glabrous; petals 6.5-10.5 mm long, white to pink, spatulate, ascending to erect; siliques (27) 35-95 (110) mm long, (1.2) 1.5-2 (3) mm wide, erect, valves

glabrous, nerved to middle or above; styles short or obsolete; seeds biseriate.—Woodlands and meadows at moderate to high elevations, in Beaver, Cache, Duchesne, Garfield, Grand, Iron, Juab, Kane, Millard, Piute, Rich, Salt Lake, San Juan, Sanpete, Sevier, Summit, Uintah, Wasatch, Washington, Wayne, and Weber counties; Alaska and Yukon east to the Atlantic and south to California, Arizona, and New Mexico.

***Arabis fendleri*** (S. Wats.) Greene. Plants perennial or rarely biennial, stems (1.4) 2-6 dm tall, solitary or 2-5 or more from a simple, or rarely branched, caudex, not arising from between the basal rosette and a tuft of ascending leaves, variously hairy to subglabrous with coarse simple or branched hairs at base only; basal leaves (1) 1.5-6 cm long, (0.2) 0.3-1.3 (1.5) cm wide, oblanceolate, coarsely dentate to subentire, ciliate with simple or forked hairs, surfaces similarly hairy to subglabrous; cauline leaves usually longer than internodes, several to numerous, (0.5) 1-3.5 (4) cm long, 0.3-0.7 cm wide, oblong to lanceolate, entire or rarely toothed, sessile and auriculate, glabrous or lower ones hairy; pedicels 4-18 mm long in fruit, ascending-spreading to descending, glabrous; sepals 2.3-5 mm long, pubescent or glabrous, more or less gibbous; petals 5-7 (8) mm long, white to pink, spatulate, ascending to erect; siliques 30-46 (60) mm long, 1.5-2.1 (2.5) mm wide, divaricate to curved pendulous, valves glabrous, nerved to middle or above; styles obsolete; seeds biseriate.—Woodlands, shrublands, and grasslands from low to moderate elevations, in eastern and southern Utah; Wyoming and Colorado west to Nevada, and south to Texas and Mexico.

1. Basal leaves dentate, definitely oblanceolate; petals usually pink ..... *A. fendleri* var. *fendleri*  
Basal leaves entire, narrowly oblanceolate; petals white ..... *A. fendleri* var. *spatifolia*

*Var. fendleri*. [*A. holboellii* var. *fendleri* S. Wats. in Gray] Garfield, Millard, Piute, San Juan, Sevier, and Washington counties; range of the species.

*Var. spatifolia* (Rydb.) Rollins. [*A. spatifolia* Rydb.] Known only from Daggett County; Wyoming, Colorado, and New Mexico.

*Arabis glabra* (L.) Bernh. Plants biennial or rarely perennial, stems 3-8 (10) dm tall, solitary or 2 or 3, from a taproot, not arising from between the basal rosette and a tuft of ascending leaves, usually hirsute with simple or forked hairs, rarely with appressed dendritic hairs, at base only; basal leaves 3-10 (15) cm long, 0.8-3.5 (5) cm wide, oblong-oblancheolate to spatulate, sinuate-dentate to entire, more or less ciliate with forked or dendritic hairs, surfaces (es-

pecially the veins) hirsute with simple or forked hairs; cauline leaves usually longer than internodes (at least below), numerous, 1.5-9 (12) cm long, 0.4-2.3 (3.5) cm wide, lanceolate, denticulate to entire, sessile and auriculate, glabrous at least above; pedicels 4-12 mm long in fruit, erect, often appressed, glabrous; sepals 3.3-4.5 mm long, glabrous, often tinged reddish-purple; petals 4.7-6 (7) mm long, cream or rarely pinkish, narrowly spatulate, ascending to erect; siliques 40-90 mm long, 1-1.5 mm wide, strictly erect, valves glabrous, nerved to the middle or above; styles about 0.5 mm long, stigma 0.8-1.1 mm broad; seeds more or less biseriate.— Sagebrush, oak, and woodland communities at low to moderate elevations in northern Utah; widespread in North America; Europe.

- 1. Pubescence of stem base appressed, of several-branched hairs ..... *A. glabra* var. *furcatipilis*  
Pubescence of stem base hirsute with simple or merely forked hairs .....  
..... *A. glabra* var. *glabra*

*Var. furcatipilis* Hopkins. Cache and Salt Lake counties, and to be expected elsewhere; Utah and California.

*Var. glabra*. [*Turritis glabra* L.; *A. perfoliata* Lam.; *T. macrocarpa* Nutt. ex Torr. and Gray; *A. macrocarpa* (Nutt.) Torr.] Box Elder, Millard, Tooele, Uintah, Utah, Wasatch, and Weber counties; range of the species.

*Arabis hirsuta* (L.) Scop. [*Turritis hirsuta* L.] Plants biennial or perennial, stems (0.9) 1.5-6 (7) dm tall, solitary or more commonly 2-6 or more, from a simple or branched caudex, not arising from between the basal rosette and a tuft of ascending leaves, hirsute with simple or forked hairs, at base at least; basal leaves (0.8) 1.5-6 (8) cm long, 0.3-1.8 (3) cm wide, elliptic to oblong or oblanceolate, entire or more or less dentate, ciliate with simple or forked hairs,

surfaces glabrous or more or less hirsute with simple or forked hairs; cauline leaves usually longer than internodes at least below, numerous, (0.6) 1-5 cm long, 0.2-2 cm wide, oblong to lanceolate, toothed to entire, sessile and auriculate, rarely merely sessile, hirsute or glabrous; pedicels 3-18 mm long in fruit, erect, appressed, glabrous; sepals 2.2-4 (4.5) mm long, glabrous or sparingly hairy, seldom tinged reddish-purple; petals 3.2-7 (9) mm long, white or pink, oblong to spatulate, ascending to erect; siliques 30-55 (60) mm long, 1-1.5 (2) mm wide, valves glabrous, erect, nerved to above the middle; styles 0.3-1 mm long, stigma 0.3-0.7 mm broad; seeds uniseriate.— Moist woods at moderate to high elevations; Alaska and Yukon east to the Atlantic and south to California, Arizona, and New Mexico; circumboreal.

- 1. Flowers 5-9 mm long; siliques often more or less divergent .... *A. hirsuta* var. *glabrata*  
Flowers 3-5 mm long; siliques strictly erect ..... *A. hirsuta* var. *pycnocarpa*

*Var. glabrata* Torr. & Gray. [*Turritis pectris* Nutt. ex Torr. & Gray; *A. pycnocarpa* var. *glabra* (Torr. & Gray) Hopkins].



Raft River Mts., Box Elder Co. (US), and Deep Creek Mts., Juab Co., Utah; British Columbia south to California, east to Wyoming and Utah.

**Var. *pyncocarpa*** (Hopkins) Rollins. [*Turritis ovata* Pursh?; *A. hirsuta* var. *ovata* (Pursh) Torr. & Gray?; *A. pyncocarpa* Hopkins] Mountains in northern and central Utah; Daggett (US), Duchesne, Emery, Garfield, Kane, Piute, Salt Lake, Sevier (US), Uintah (US), Utah, and Wasatch counties; widespread in North America.

The name "*ovata*" may have priority over the name "*pyncocarpa*", but, until the type of the Pursh name can be discovered, the description is inadequate to know exactly which species of *Arabis* Pursh had in mind, and thus the name cannot be applied to our plants.

***Arabis holboellii*** Hornem. Plants biennial or perennial, stems (1) 2-11.5 dm tall, solitary or less commonly 2-6, from a simple or branching caudex, not arising from between the basal rosette and a tuft of ascending leaves, pubescent with appressed or spread-

ing hairs, at least at base; basal leaves (1) 1.5-5.5 cm long, 0.2-8 mm wide, elliptic to oblanceolate, entire to dentate, with dendritic hairs on margins and usually on surfaces, rarely with some simple or forked hairs near petiole base; cauline leaves usually longer than internodes, at least below; numerous, 1.2-6.5 cm long, 0.2-0.9 cm wide, oblong to lanceolate, entire or some toothed, sessile and auriculate, pubescent to glabrous; pedicels 5-23 mm long in fruit, reflexed to loosely descending, glabrous or pubescent; sepals 2.9-5 mm long, pubescent or glabrous, often tinged reddish; petals 4-9 (10) mm long, pink to lavender or white, spatulate, erect or ascending; siliques (20) 25-70 mm long, 1-2.5 mm wide, reflexed to loosely pendulous, the valves glabrous, nerved to below or above middle; style obsolete or very short, stigma not much enlarged; seeds biseriate.—Foothills and mountains from lower to moderate elevations among shrubs or in woods; Alaska and Yukon east to Greenland and south to California, Utah, Colorado, and Nebraska.

1. Pedicels gently curved downward; pods pendulous, often somewhat curved inward ..... *A. holboellii* var. *pinetorum*
- Pedicels abruptly curved at the base, deflexed; siliques strictly reflexed to descending and often straight ..... *A. holboellii* var. *secunda*

**Var. *pinetorum*** (Tidestr.) Rollins. [*A. pinetorum* Tidestr.] Widespread in Beaver, Box Elder, Cache, Daggett, Duchesne, Emery, Garfield, Juab, Kane, Millard, Salt Lake, Sevier, Summit, Uintah, Utah, Wasatch, and Washington counties; Saskatchewan to British Columbia south to California, Colorado, and Nebraska.

**Var. *secunda*** (Howell) Jeps. [*A. retrofracta* Grah.; *Turritis retrofracta* (Grah.) Hook.; *Streptanthus virgatus* Nutt. ex Torr. and Gray; *A. secunda* Howell; *A. arcuata* var. *secunda* (Howell) Robins.; *A. holboellii* var. *retrofracta* (Grah.) Rydb.; *A. rhodantha* Greene; *A. exilis* A. Nels.; *A. tenuis* Greene; *A. lignipes* A. Nels.; *A. consanguinea* Greene; *A. kochii* Blankinship, not Jordan; *A. sparsiflora* var. *secunda* (Howell) Piper; *A. caduca* Greene; *A. macdougallii* Rydb.] Widespread and common in Beaver, Cache, Daggett, Davis, Duchesne, Grand, Millard,

Piute, Salt Lake, San Juan, Sevier, Summit, Tooele, Uintah, Utah, Wasatch, Washington, and Weber counties; Quebec to Alaska and British Columbia, south to California and Colorado.

The name var. *secunda* is taken up for our most common species of the genus as the varietal rank was first occupied by "*secunda*" (1895), one year ahead of Rydberg's publication of var. *retrofracta*.

***Arabis lemmonii*** S. Wats. [*A. canescens* var. *latifolia* S. Wats.; *A. latifolia* (S. Wats.) Piper; *A. bracteolata* Greene; *A. egglesonii* Rydb.] Plants perennial, the stems 0.5-2 dm tall, several to many from a branching caudex, often with tufts of ascending leaves, pubescent to glabrous; basal leaves 0.8-2 (2.5) cm long, 0.2-0.5 cm wide, spatulate to oblanceolate, usually entire, marginally pubescent with dendritic hairs, rarely with some hairs simple or forked on the petiole

bases, surfaces densely pubescent with dendritic hairs; cauline leaves shorter or longer than internodes, few, 0.4-1.5 cm long, 0.1-0.3 cm wide, elliptic-oblong to lanceolate, entire, sessile and auriculate (at least some), pubescent to glabrous; pedicels 2-6 mm long in fruit, ascending to spreading, glabrous or pubescent; sepals 2-3.5 mm long, glabrous or pubescent, often purplish; petals 4-5.5 (6) mm long, pink to lavender, spatulate, erect to ascending; siliques mostly 20-50 mm long, (1.5) 2-2.5 (3) mm wide, ascending, spreading or somewhat pendulous, valves glabrous, nerved to middle; seeds uniseriate.—Mountain summits at high elevations, mostly 3300-4000 m elevation, in Duchesne, Summit, and Salt Lake counties; Alaska and Yukon south to California, Colorado, and Montana.

Our plant is var. *lemmonii*.

*Arabis lignifera* A. Nels. Plants perennial, the stems 1.5-6 dm tall, solitary or 2-5 from a simple or branching caudex, not arising from between basal rosette and a tuft of ascending leaves, more or less densely pubescent with dendritic hairs, at least below; basal leaves 1.5-4 (5) cm long, 0.3-1 cm wide, spatulate to oblanceolate, entire or nearly so, densely pubescent with dendritic hairs, rarely with long simple or forked hairs on the petiole base; cauline leaves from longer to shorter than internodes, numerous, 0.8-3.5 cm long, 0.2-1 cm wide, oblong to lanceolate, sessile and auriculate, pubescent to glabrous; pedicels (3) 5-15 mm long in fruit, spreading to arching downward, glabrous or pubescent; sepals 3-5.6 mm long, pubescent or glabrate; petals 5.2-9.1 mm long, pink to lavender, spatulate, erect or ascending; siliques 30-60 (65) mm long, 1.5-2 mm wide, more or less spreading-pendulous, the valves glabrous, nerved to middle or above; style short or obsolete, stigma not or only slightly expanded; seeds uniseriate to more or less biseriate.—Foot-hills and desert ranges at moderately low to low elevations in desert shrub, sagebrush, and juniper-pinyon woodlands in Beaver, Box Elder, Carbon, Daggett, Duchesne, Iron, Juab, Kane, Millard, Salt Lake, San Juan, Summit, Tooele, and Uintah counties;

Wyoming and Idaho south to Nevada and Arizona.

*Arabis lyallii* S. Wats. [*A. drummondii* var. *alpina* S. Wats.; *A. oreophila* Rydb.; *A. amnerifolia* Greene; *A. densa* Greene; *A. multiceps* Greene; *A. drummondii* var. *lyallii* (S. Wats.) Jeps.; *A. drummondii* var. *oreophila* (Rydb.) Hopkins]. Plants perennial, stems 0.3-2.5 dm tall, few to many from a branching caudex, often with tufts of ascending leaves, glabrous; basal leaves 0.5-2.5 cm long, 0.2-0.6 cm wide, oblanceolate to spatulate, entire, glabrous or margin and surfaces sparingly pubescent with dendritic hairs; cauline leaves shorter to longer than internodes, few, 0.6-2 cm long, 0.2-0.6 cm wide, ovate to lanceolate or oblong, entire, sessile and at least some auriculate, usually glabrous; pedicels 4-10 (13) mm long, erect-ascending, glabrous; sepals 3.3-4.5 mm long, glabrous, not or only slightly gibbous, often purplish; petals 7-9 (10) mm long, bright pink to lavender, spatulate, erect or ascending; silique 20-60 mm long, 2-3 mm wide, erect-ascending, valves glabrous, nerved to middle; style short, stigma not or slightly enlarged; seeds uniseriate or more or less biseriate.—Alpine tundra, krumholz, glacial moraines and among subalpine conifers, at 2600-3700 m elevation in Cache, Daggett, Duchesne, Millard, Salt Lake, Uintah, Utah, Wasatch, and Weber counties; Yukon and British Columbia south to California, Nevada, northern Utah, and western Wyoming. Our material is var. *lyallii*.

*Arabis microphylla* Nutt. ex Torr. & Gray. Plants perennial, stems 0.5-3 (5) dm tall, several to many from a branching caudex, tufts of ascending leaves lacking or poorly developed, glabrous throughout or hairy below with simple or forked hairs; basal leaves 0.7-2.5 cm long, 0.2-0.5 cm wide, oblanceolate to spatulate, entire or rarely toothed, margins with dendritic or merely sessile and forked hairs, densely pubescent with minute dendritic hairs; cauline leaves often shorter than internodes, few, 0.6-2 cm long, 0.1-0.6 cm wide, oblong to lance-linear, entire or some toothed, sessile and auriculate, glabrous or lowermost pubescent; pedicels 4-13 (15) mm long, ascending to spreading-ascending, glabrous or



*recondita* Greene; *A. angulata* Greene ex Woot. & Standl.] Plants perennial, stems 0.9-5.5 (6) dm tall, (one) several to many from simple or branching herbaceous to woody caudex, arising from between basal rosette and a tuft of ascending leaves, pubescent with dendritic hairs on margin and on surfaces, rarely with simple or forked hairs along petiole base; cauline leaves longer than internodes at least below, several, 0.7-4 cm long, 0.2-0.8 cm wide, oblong to lanceolate, entire to toothed, hairy or the upper glabrous; pedicels 4-24 mm long, spreading to arched downward, glabrous or pubescent; sepals 3-4 (4.5) mm long, often purplish, usually dendritic hairy; petals 5-7 (9) mm long, pink to lavender, spatulate, erect or spreading; siliques (20) 27-55 (60) mm long, 1.2-2 mm wide, spreading to pendulous, valves glabrous, nerveless or nerved at the base; style obsolete or very short, stigma not enlarged; seeds uniseriate.— Warm desert shrub, pinyon-juniper, sagebrush, ponderosa pine, and oakbrush communities at low to moderate elevations in Beaver, Carbon, Emery, Garfield, Grand, Kane, Millard, Piute, San Juan, Sanpete, Sevier, Wayne, and Washington counties; Colorado and New Mexico to Nevada, California, and Baja California.

Our specimens are far from uniform, with some approaching *A. lignifera* on the one extreme, and *A. selbyi* on the other.

*Arabis puberula* Nutt. ex Torr. & Gray. [*A. beckwithii* S. Wats.; *Erysimum puberulum* (Nutt.) Kuntze; *A. subpinnatifida* var. *beckwithii* (S. Wats.) Jeps.; *A. arida* Greene; *A. lignipes* var. *impar* A. Nels.; *A. sabulosa* M. E. Jones; *A. sabulosa* var. *frigida* M. E. Jones; *A. sabulosa* var. *colorata* M. E. Jones; *A. subpinnatifida* var. *impar* (A. Nels.) Rollins] Plants perennial or infrequently biennial, stems (0.7) 1-3 dm tall or more, solitary or few from a simple caudex, not arising from between a basal rosette and a tuft of ascending leaves, pubescent throughout with dendritic hairs, rarely glabrous above; basal leaves 1-2.5 (3) cm long, 0.2-0.6 cm wide, oblanceolate, entire or toothed, pubescent with minute dendritic hairs; cauline leaves usually longer than internodes, several to many, 1-3 cm

long, 0.2-0.8 cm wide, toothed to entire, sessile and at least some auriculate, hairy like the basal leaves; pedicels 2-7 mm long, arched downward, pubescent; sepals 3.5-6 mm long, dendritic hairy; petals 7-11 mm long, pink to white, spatulate, erect or ascending; siliques (25) 30-50 (60) mm long, 2-3 mm wide, pendulous to reflexed, valves copiously hairy to glabrate, nerved to below middle; style obsolete, stigma not enlarged; seeds uniseriate.— Oakbrush community at moderate elevations in Salt Lake County (*Rose 1048*, BRY), and to be sought elsewhere; Washington and Idaho south to California and Nevada.

A closely related species, *Arabis cobrensis* M. E. Jones, is to be sought in extreme northern Utah. The species occurs just north of the state line in Uinta County, Wyoming, and in northeastern Elko County, Nevada, but as yet it is not known from Utah. *Arabis cobrensis* is a well-defined perennial with a well-branched caudex, the basal leaves are only 0.1-0.3 cm wide, the few cauline leaves are remote and only 0.1-0.3 cm wide, and the petals are 4-6 mm long. It is to be sought in Daggett and Box Elder counties.

*Arabis pulchra* M. E. Jones. Plants perennial, stems 1.5-6 dm tall, solitary or several from a branching herbaceous to woody caudex, not arising from between basal rosette and a tuft of ascending leaves, pubescent with dendritic hairs throughout or glabrous above; basal leaves in poorly developed rosettes, 1-6 cm long, 0.2-0.6 cm wide, narrowly oblanceolate to spatulate, entire, densely hairy with minute hairs; cauline leaves shorter or longer than internodes, many, 1.2-6 cm long, 0.1-0.5 cm wide, entire, sessile and mostly not auriculate, hairy like the basal leaves; pedicels 5-18 mm long, recurved to pendulous in fruit, pubescent to glabrate; sepals 5-8.2 mm long, more or less gibbous, dendritic-pubescent, often purplish; petals 9-18.5 mm long, pale pink to white or pink to lavender or purple, spatulate to obovate-spatulate, spreading or ascending to erect; siliques 35-55 (65) mm long, 1.8-2.5 (3) mm wide, pendulous to reflexed, valves copiously hairy to glabrate, nerved to middle or



above; style obsolete or very short, stigma not expanded; seeds biseriate.— Desert shrub, pinyon-juniper, and sagebrush communities from 650 to 2000 m elevation in

the southern two-thirds of Utah; common from Colorado and New Mexico west to California and Baja California.

- 1. Flowers lavender to purple, 9-11 mm long; petals ascending to erect ..... *A. pulchra* var. *munciensis*  
Flowers pale pink or white, less commonly lavender, 10-18.5 mm long; petals spreading ..... *A. pulchra* var. *pallens*

Var. *munciensis* M. E. Jones. Desert shrublands in Beaver, Juab, Iron, Kane, Millard, Tooele, and Washington counties; Nevada and California.

Var. *pallens* M. E. Jones. [*A. formosa* Greene] Desert shrublands to pinyon-juniper zone in Duchesne, Emery, Garfield, Grand, Kane, San Juan, Uintah and Wayne counties; Colorado, New Mexico, and Arizona.

*Arabis selbyi* Rydb. Plants perennial, the stems 1.5-4 (5) dm tall, usually several from a simple or branching caudex, arising from between basal rosette and an ascending tuft of leaves, pubescent below with dendritic or forked hairs; basal leaves 1.5-4 (6) cm long, 0.2-1 cm wide, oblanceolate to spatulate, usually entire, densely to sparsely pubescent with dendritic hairs on margin and surfaces, sometimes with simple or branched hairs along petiole base; cauline leaves usually shorter than internodes, few to several, 0.3-2.5 (3) cm long, 0.1-0.4 cm wide, narrowly oblong to lanceolate, entire, hairy or glabrous; pedicels 4-15 mm long in fruit, spreading-ascending, glabrous or pubescent; sepals 2.6-3.5 (4) mm long, often purplish, usually dendritic hairy; petals 5-7 (8) mm long, pink to lavender, spatulate, erect or ascending; siliques 30-55 (60) mm long, 1.2-1.8 mm wide, spreading-ascending to more or less pendulous, valves glabrous, nerved at base or nerveless; style obsolete or very short, stigma not enlarged; seeds uniseriate.— Sagebrush and pinyon-juniper communities mostly between 1500 and 2200 m elevation in Carbon, Duchesne, Emery, Garfield, Grand, San Juan, Uintah, and Utah counties; western Colorado and north-western New Mexico.

Only the slightly more ascending pedicels and usually entire or subentire leaves serve to distinguish this entity from *Arabis per-*

*ennans*. Possibly, it would be treated better at an infraspecific level within that species.

*Arabis shockleyi* Munz. Plants perennial or infrequently biennial, stems 1.2-3.5 (4) dm tall, solitary or 2-4 from a simple or branching caudex, not arising from between a basal rosette and a tuft of ascending leaves, densely pubescent throughout with minute dendritic hairs, often somewhat less densely so above; basal leaves 1.6-3 (3.5) cm long, 0.5-0.9 cm wide, oblanceolate to spatulate, entire, densely pubescent throughout with dendritic hairs only; cauline leaves much longer than internodes, numerous, 1.2-3 cm long, 0.5-1.2 cm wide, ovate-lanceolate to lance-attenuate, entire or nearly so, sessile and auriculate, hairy as on basal leaves; pedicels 12-17 mm long in fruit, ascending, pubescent; sepals 5.5-7 mm long, often reddish, dendritic hairy; petals 7.5-10 mm long, pink to lavender, spatulate, erect or ascending; siliques 42-65 mm long, 1.2-1.8 mm wide, ascending to spreading, valves glabrous, nerved to about middle; style up to 0.8 mm long, stigma not much expanded; seeds biseriate.— Desert shrublands and pinyon-juniper communities mostly 1430 to 1900 m elevation in Juab, Millard, and Tooele counties; north-central and western Nevada, and in eastern and southern California.

*Arabis sparsiflora* Nutt. ex Torr. and Gray. Plants perennial, stems 2.3-10 dm tall, solitary or less commonly 2 or more from a simple or branching caudex, not arising from between the basal rosette and a tuft of ascending leaves, pubescent with appressed or spreading hairs at least below; basal leaves 3-7 (9) cm long, 0.3-0.6 (0.9) cm wide, oblanceolate, entire or dentate, pubescent with coarse dendritic hairs usually on both surfaces; cauline leaves longer than in-



ternodes, numerous, 1.5-6 cm long or more, 0.3-0.7 cm wide, oblong to lanceolate, entire or the lower toothed, sessile and auriculate, hairy like the basal leaves or wholly glabrous; pedicels 5-15 mm long, ascending-spreading, glabrous or pubescent; sepals 4.7-6 mm long, dendritic hairy; petals 8-12 mm long, pink to lavender or purple, spatulate, ascending to erect; siliques 60-100 (120) mm

long, 1.2-2 mm wide, ascending to curved-descending; style obsolete or nearly so, stigma not expanded; seeds uniseriate.—Foothills and canyons at low to moderate elevations in oakbrush, sagebrush, and streamside forest communities of northern Utah; British Columbia and Alberta south to California, Utah, and Wyoming.

1. Basal leaves entire, narrowly oblanceolate; pedicels ascending-spreading .....  
 ..... *A. sparsiflora* var. *sparsiflora*  
 Basal leaves dentate, oblanceolate; pedicels spreading ..... *A. sparsiflora* var. *subvillosa*

**Var. *sparsiflora*.** [*A. peramoena* Greene; *A. sparsiflora* var. *peramoena* (Greene) Rollins] Foothills and stream courses in Cache, Salt Lake, and Weber counties; California, Oregon, and Idaho.

**Var. *subvillosa*** (S. Wats.) Rollins. [*A. arcuata* var. *subvillosa* S. Wats.; *A. perelegans* Nels. in Coult. and Nels.] Foothills and mountain slopes in Davis, Uintah, and Weber counties; Washington to Montana south to Wyoming, Utah, Nevada, and California.

#### ARMORACIA Gaertn.

##### Horse-Radish

Plants glabrous perennials from tuberous-thickened taproots; leaves alternate, simple, crenately toothed or lobed, petiolate to subsessile, not auriculate; flowers racemose, the pedicels ascending, not subtended by bracts; sepals 4, deciduous; petals 4, white, not emarginate; stamens 6, at least the 2 short stamens subtended by glands; style short, the capitate stigma hemispheric; fruit a silicle, bilocular, about as long as broad, obovoid-ellipsoid, the valves with an inconspicuous midnerve; seeds apparently never developing.

A genus of 3 species of Eurasia.

***Armoracia rusticana*** Gaertn. [*Cochlearia armoracia* L.; *Nasturtium armoracia* (L.) Fries; *Rorippa armoracia* (L.) A. S. Hitchc.; *Radicula armoracia* (L.) A. Gray; *Armoracia armoracia* (L.) Cockerell] Plants perennial, stems 6-10 dm tall or more, few to many arising from summit of root crown; basal leaves oblong to oblong-lanceolate, blades 15-50 cm long, 10-15 cm wide, base cordate

to rounded, petioles 0.6-4 dm long or more; cauline leaves reduced and only short petiolate to subsessile upwards, lanceolate to elliptic and crenately toothed to lobed, glabrous; pedicels mostly 8-11 mm long, ascending in fruit; sepals 2-2.5 mm long, caducous, greenish, glabrous; petals 4.2-4.5 (5) mm long, white, obovate-spatulate, surpassing sepals; silicles 3-6 mm long and about as wide, valves glabrous; styles 0.2-0.3 mm long, hemispheric stigma to 0.5 mm broad or more.—Cultivated and occasionally escaping and persistent as in Cache, Salt Lake, Summit, Utah, and Weber counties, and most likely elsewhere in agricultural regions of the state; widespread in North America; introduced from Eurasia.

#### ATHYSANUS Greene

Plants annuals with typically dendritic and with some simple hirsute hairs, arising from slender taproots; leaves alternate, simple, few-toothed, sessile, and not auriculate; flowers racemose, pedicels recurved, not subtended by bracts; sepals 4, deciduous; petals 4, white, not emarginate; stamens 6; style short, stigma capitate; fruit a silicle, unilocular, about as broad as long, orbicular, compressed, valves nerveless; seeds solitary.

A monotypic genus.

***Athysanus pusillus*** (Hook.) Greene. [*Thysanocarpus pusillus* Hook.; *A. pusillus* var. *glabrior* S. Wats.] Plants annual, stems erect or ascending, usually branched from near base, 0.8-3 dm tall; leaves ovate to obovate or spatulate (especially the lowermost), den-

dritle hairy on both surfaces; pedicels recurved, 1-4 mm long; sepals about 1 mm long, cream to purplish, glabrous; petals 1-2 mm long, white, oblong-spatulate, surpassing sepals; silicles 1.5-2.5 mm long and about as wide, valves hirsute with simple, uncinat hairs, emarginate at style; styles persistent, 0.2-0.3 mm long.—Dry sites at low elevations, not definitely known from Utah but to be expected in Washington County; British Columbia south to California and Arizona.

#### BARBAREA R. Br.

Plants glabrous to sparsely hirsute biennials or rarely annuals from taproots; leaves alternate, lyrate-pinnatifid to pinnately compound, cauline leaves auriculate-clasping and often falsely petiolate above clasping base; flowers racemose, pedicels ascending to erect, not subtended by bracts; sepals 4, deciduous; petals 4, yellow, truncate to rounded apically; stamens 6, filaments lacking glandular processes; style stout, abruptly contracted to capitate stigma; fruit a silique, many times longer than broad, linear, only slightly compressed, more or less contracted between the seeds, valves 1-nerved; seeds numerous, uniseriate.

About 20 species of the northern temperate regions of the world.

*Barbarea orthoceras* Ledeb. [*B. americana* Rydb.; *Campe orthoceras* (Ledeb.) Heller; *B. orthoceras* var. *dolichocarpa* Fern.] Plants erect, stems 1.5-10 dm tall, glabrous; basal leaves lyrate-pinnatifid to pinnately compound, rarely reduced to terminal lobe, mostly (1.5) 4-15 (20) cm long, 1-2.5 (4) cm wide, glabrous or petiole and lower lobes sparsely hirsute; cauline leaves reduced upwards, auriculate-clasping; pedicels 2-4 mm long, glabrous, ascending; sepals 2.5-3.5 mm long, yellowish, glabrous; petals 4-5.5 mm long, yellow, spatulate-oblancoate, ascending-spreading; siliques (15) 20-50 mm long, 1.5-2.5 mm wide, erect or ascending, valves glabrous, prominently nerved to apex; style beaklike, (0.5) 1-2 mm long, abruptly contracted to stigma; seeds uniseriate, pitted.—Moist meadows, roadsides, and openings in woods from 1350 to 2500 m elevation in Box Elder, Salt Lake, Utah, Wasatch, and

Washington counties, and to be expected almost throughout the state; Alaska and Yukon east to the Atlantic and south to California, Nevada, Utah, and Colorado; Eurasia.

#### BERTEROA DC.

Plants stellate-pubescent annuals or infrequently winter annuals from taproots; leaves alternate and basal, simple, entire, reduced upwardly and sessile, not auriculate; flowers racemose, pedicels erect-ascending, not subtended by bracts; sepals 4, deciduous; petals 4, white, deeply emarginate and often bilobed; stamens 6, the filaments lacking glandular processes; style long, slender, stigma capitate; fruit a silicle, 1-3 times longer than broad, compressed parallel to septum, valves 1-nerved or nerveless; seeds several.

About 8 species of worldwide distribution.

*Berberoa incana* (L.) DC. [*Alyssum incanum* L.] Plants erect, stems 3-10 dm tall or more, appressed stellate-hairy; basal leaves oblanceolate, 3-5 cm long, entire, petiolate, usually withered at anthesis; cauline leaves reduced upwards, sessile or short-petiolate below, stellate-hairy; pedicels erect or ascending, 4-10 mm long, stellate and sometimes more or less hirsute; sepals 2-3 mm long, greenish to whitish, stellate-hairy; petals 4-6 mm long, white, deeply bilobed; silicles 5-7 mm long, 2-3 mm wide, moderately inflated, stellate hairy; styles (1.5) 2-3 mm long, persistent.—Roadsides and other disturbed places, not definitely known from Utah but to be expected; widespread in North America; Europe.

#### BRASSICA L.

Plants glabrous or hirsute annuals from taproots; leaves alternate and basal, variously lobed to entire, basal ones often lyrate-pinnatifid, reduced upwardly and petiolate to sessile or auriculate; flowers racemose, pedicels erect or ascending, not subtended by bracts; sepals 4, deciduous; petals 4, yellow; stamens 6, filaments lacking glandular processes; styles slender to thick, mostly well developed, stigma capitate; fruit a silicle, several to many times longer than

broad, linear, terete or nearly so, often more or less constricted, valves 1–3-nerved, apical portion producing a stout 1–3-nerved beak; seeds several to many, uniseriate.

Several cultivated members of this genus are present in our region in addition to the

weedy adventives distinguished below. They are: *Brassica caulorapa* Pasquale (kohlrabi); *B. napobrassica* Mill. (rutabaga); *B. oleracea* L. var. *botrytis* L. (cauliflower), var. *capitata* L. (cabbage), var. *gemifera* Zenker (brussel sprout), and var. *italica* Plenck (broccoli); and *B. rapa* L. (turnip).

- 1. Cauline leaves sessile, auriculate-clasping, glaucous and entire or nearly so ..... *B. campestris*  
Cauline leaves petiolate and not auriculate, or, if rarely so, falsely petiolate above the clasping base ..... 2
- 2(1). Valves of fruit, and often the pedicels and raceme rachis, hirsute with course, spreading hairs; plants cultivated and escaping ..... *B. hirta*  
Valves of fruit, pedicels, and raceme rachis glabrous; plants adventive weeds ..... 3
- 3(2). Siliques with a flattened, 2-edged or angular beak, valves and beak strongly 3 (5)-nerved ..... *B. kaber*  
Siliques with a cylindrical or rarely slender-conic beak, valves and beak with 1 (rarely with 2 additional delicate) nerves ..... 4
- 4(3). Pedicels 2-6 mm long; siliques 1-2.5 cm long, 1-1.8 mm wide, ascending-appressed ..... *B. nigra*  
Pedicels mostly (5) 10-15 mm long; siliques 2-4 cm long, 2-3 mm wide, ascending to erect but not appressed ..... *B. juncea*

*Brassica campestris* L. [*B. rapa* of authors, not L.; *B. napus* of authors, not L.] Plants erect, glabrous or with very few hairs, stems 2.5-10 dm long or more, simple or branched; basal leaves lyrate-pinnatifid, 5-18 cm long, terminal lobe mostly 2-5 cm wide, crenate-dentate; lower cauline leaves similar to basal ones, reduced upwards, becoming auriculate-clasping and dentate to entire; pedicels 7-20 mm long, slender, ascending, glabrous; sepals 4.5-6 mm long, yellowish to greenish; petals 6-10 mm long, yellow; siliques 30-70 mm long, (1.5) 2.5-3.5 mm thick, beak 8-15 mm long, 1-nerved, valves conspicuously 1-nerved and with 2 more or less delicate lateral nerves, glabrous.—Cultivated fields, roadsides, and waste places in Summit, Utah, and Washington counties, though probably cosmopolitan in the state; widespread in temperate regions of the world; adventive from Europe.

*Brassica hirta* Moench. [*Sinapsis alba* L.; *B. alba* (L.) Rabenh., not Gilib.] Plants erect, pubescent with coarse, descending hairs at least below, the stems 2-10 dm tall,

usually branched; basal leaves lyrate-pinnatifid, mostly 5-15 cm long, the terminal lobe 3-10 cm wide, obscurely crenate-dentate; cauline leaves reduced upwards, usually all petiolate, becoming merely lobed, not auriculate; pedicels 5-10 mm long, slender or stout, spreading, often hirsute; sepals 4-5 mm long, yellowish, glabrous; petals 7-10 mm long, yellow; siliques (20) 30-50 mm long, 3-4.5 mm wide, the beak 8-16 mm long, 3 (5) nerved, the valves conspicuously 3-nerved, hirsute.—Cultivated white mustard of commerce and rarely escaping, but potentially a noxious weed of cultivated land and to be expected in agricultural regions of the state; widespread in the western United States; adventive or introduced from Europe.

*Brassica juncea* (L.) Czernj. [*Sinapsis juncea* L.] Indian Mustard. Plants erect, glabrous or hirsute, the stems 3-10 dm tall or more, usually branched; basal leaves lyrate-pinnatifid, 8-25 cm long, terminal lobe 5-15 cm wide, crenate to dentate or lobed; cauline leaves reduced upwards, short-petiolate to sessile, not auriculate-clasping;

pedicels 8-17 mm long, slender to stout, ascending, glabrous; sepals 4-6 mm long, yellowish, glabrous; petals (5.5) 7-12 mm long, yellow; siliques 20-50 mm long, 2-3 mm wide, beak 6-12 mm long, 1-veined, valves 1 (or lightly 3) nerved, glabrous.—A weed of disturbed soils (Washington County) but not yet common in the state; introduced from Asia.

*Brassica kaber* (DC.) Wheeler. [*Sinapsis arvensis* L.; *B. arvensis* Rabenh., not L.; *S. kaber* DC.] Charlock. Plants erect, pubescent with coarse spreading hairs at least below, stems 3-10 dm tall or more, simple or branched; basal leaves lyrate-pinnatifid to merely dentate, 5-20 cm long, 3-10 cm wide; cauline leaves reduced upwards, short-petiolate or sessile, not auriculate-clasping, or, if apparently so, falsely petiolate or leaves sinuate-dentate; pedicels 2-6 mm long, ascending, stout, glabrous; sepals 4-5 mm long, yellowish, glabrous; petals 8-14 mm long, yellow; siliques 30-50 mm long, 2-3 mm thick, beak 7-15 mm long, 3-veined, valves 3 (5)-nerved, glabrous.—Roadsides, fields, and ditch banks in Summit, Utah, and Washington counties, but probably in all counties of the state; widespread in temperate portions of the world; adventive from Europe.

*Brassica nigra* (L.) Koch in Röhling. [*Sinapsis nigra* L.] Black Mustard. Plants erect, glabrous or more usually sparsely to densely hirsute-hispid at least near base, stems 3-12 dm tall or more, usually branched; basal leaves lyrate-pinnatifid to lobed or serrate-dentate, 5-25 cm long, 2-15 cm wide; cauline leaves reduced upwards, short petiolate to sessile, not auriculate; pedicels 2-6 mm long, erect, stout, glabrous; sepals 3-4 mm long, yellowish, glabrous; petals (5) 7-12 (15) mm long, yellow; siliques 10-25 mm long, 1-2 mm wide, beak 1-5 mm long, 1-veined, valves with 1 mid-nerve and two faint lateral ones, glabrous.—Roadsides, fields, and other disturbed places in Garfield, Juab, Salt Lake, San Juan, Utah, Wasatch, Washington, Weber, and perhaps all Utah counties; widespread in North America; adventive from Europe.

This is a common weed of grainfields in northern Utah.

## CAMELINA Crantz

### False Flax

Plants pubescent with forked or stellate hairs, annual, from taproots; leaves alternate, simple, entire, auriculate-clasping basally; flowers racemose, pedicels ascending, not subtended by bracts; sepals 4, deciduous; petals 4, pale yellowish; stamens 6, filaments lacking glandular processes; styles slender, stigma capitate; fruit a silique, less than twice longer than broad, obovoid, somewhat compressed parallel to septum, valve 1-nerved; seeds several per locule, biseriate.

A Eurasian genus of 8-10 species.

*Camelina microcarpa* Andr. ex DC. Plants erect, stems (0.8) 1.5-8 dm tall or more, hirsute to subappressed with simple and forked to stellate hairs at least near base; leaves mainly cauline, basal mostly 1-7 cm long, entire or obscurely toothed, usually withered by late anthesis; cauline leaves reduced upward, at least upper ones auriculate; pedicels spreading-ascending, (6) 8-18 mm long, glabrous; sepals 2-2.7 mm long, often reddish, more or less villous; petals 3-4 (5) mm long, white or nearly so, apex rounded; siliques 5-6.5 mm long, 3-4 mm wide, moderately inflated, glabrous; styles 1-2 (2.5) mm long, persistent.—Roadsides, foothills, gardens, and other disturbed moist to dry sites in Box Elder, Juab, Millard, Salt Lake, Summit, Tooele, Utah, and Weber counties; widespread in North America; adventive from Asia.

## CAPESELLA Medic.

### Nom. Cons.

Plants stellate-pubescent and often with coarse simple hairs also, annual, from taproots; leaves alternate or basal, simple, dentate or variously toothed or lobed to entire, cauline ones auriculate-clasping; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, white; stamens 6, the filaments lacking glandular processes; style short, stigma capitate; fruit a silicle, less than twice longer than broad, cuneate-obcordate in outline, compressed at right angles to the septum, valves reticulately veined, strongly keeled; seeds many per locule.

A genus of European plants of perhaps 5 species, now widely disseminated as weeds.

*Capsella bursa-pastoris* (L.) Medic. [*Thlaspi bursa-pastoris* L.; *Bursa pastoris* Weber in Wigg.; *Bursa bursa-pastoris* (L.) Britton] Sheperd's Purse. Plants erect, stems 1-5 dm tall, stellate pubescent and more or less hirsute; basal leaves oblanceolate in outline, 2.5-16 (20) cm long, 0.5-2.8 (4) cm wide, lyrate-pinnatifid to merely toothed or subentire; cauline leaves much reduced upwards, sessile and auriculate; sepals 1.2-2.5 mm long, often reddish, pubescent or glabrous; petals 2-4 mm long, white to pinkish, apex rounded; silicles 4.5-8 mm long, 3-5 (6) mm wide, cuneate-obcordate, glabrous; styles 0.3-0.6 (1) mm long, persistent.—Disturbed sites at low to moderate elevations in Cache, Garfield, Juab, Kane, Salt Lake, Uintah, Utah, Wasatch, Washington, and Weber counties (probably in all counties); widespread in North America; introduced from Europe.

We may have, in our material from Utah, two other species from Europe which are infrequently recognized: Flowers pinkish (*C.*

*rubella* Reuter) and a white flower form with the style 0.5-1 mm long (*C. thracica* Velen.).

# CARDAMINE L. Bitter Cress

Plants glabrous or sparsely pubescent with simple hairs, annual, biennial, or perennial from taproots or rhizomes; leaves alternate, sometimes with basal rosettes, simple to pinnately compound, petiolate, not auriculate; flowers racemose or rarely subcorymbose, pedicels spreading-ascending to ascending, not subtended by bracts; sepals 4, deciduous; petals 4, white to pinkish; stamens 6, filaments lacking glandular processes; style stout, stigma capitate; fruit a silique, several to many times longer than broad, slightly compressed parallel to septum, valves obscurely 1 (3)-nerved or nerveless; seeds several to many, uniseriate.

A genus of perhaps 150 species of the north temperate regions of the world.

Schulz, O. E. 1903. Monographie der Gattung *Cardamine*. Bot. Jahrb. Syst. 32: 280-623.

1. Leaves all simple, cordate-ovate to orbicular; petals 7-12 mm long; plants of stream and seep margins at middle and higher elevations ..... *C. cordifolia*  
Leaves pinnately compound, at least the lower ones; petals 2-7 mm long; plants of spring and seep margins, occasionally elsewhere, at middle to low elevations ..... 2
- 2(1). Leaflets usually 3-5, terminal leaflet, at least, more than 10 mm wide; upper leaves simple, with broadly ovate blades; petals 3-7 mm long; siliques 1-2 mm wide ..... *C. breweri*  
Leaflets usually 6-11 (rarely 3-5), terminal leaflet usually less than 10 mm wide; upper leaves compound; petals 2-3 mm long; siliques 0.7-1 mm wide ..... 3
- 3(2). Cauline leaves mostly 2-4 cm long, with narrow nondecurent lateral segments 1-3 mm wide, linear to linear-spatulate or narrowly oblong; rare ..... *C. parviflora*  
Cauline leaves mostly 4-8 cm long, with broad decurrent lateral segments 3-8 mm wide, commonly oval to broadly oblong; infrequent ..... *C. pensylvanica*

*Cardamine breweri* S. Wats. [*C. vallicola* Greene] Plants perennial, rhizomatous, erect or descending, stems (2) 2.5-5 (6) dm tall, glabrous or pubescent with simple hairs near the base; leaves mostly cauline, pinnately compound with 3-5 (rarely more in ours) leaflets, or basal and upper ones

simple, mostly 1-7 cm long, lateral leaflets mostly 10-25 mm long and 0.4-1.2 mm wide, terminal segment 12-35 mm long and 13-30 mm wide, subentire to sharply toothed, ovate to orbicular, glabrous or sparsely hirsute; pedicels 4-10 mm long or more, glabrous, ascending; sepals 1.5-2.5 mm long,



whitish, glabrous or sparingly simple-hairy; petals 3-7 mm long, white, rarely pinkish, spatulate-obovate, spreading; siliques 17-30 mm long, 1-1.8 mm wide, erect or ascending, valves glabrous, obscurely 1 (3)-nerved; styles 0.5-2 mm long, tapering to stigma; seeds 1-1.5 mm long, smooth.—Stream sides and seep margins at middle elevations in Wasatch and Utah counties, and undoubtedly elsewhere; Alaska and British Columbia south to California, Nevada, Utah, and Colorado. Our plant is var. *breweri*.

*Cardamine cordifolia* A. Gray. [*C. cordifolia* var. *pubescens* A. Gray; *C. infausta* Greene; *C. uintahensis* F. J. Hermann] Plants perennial, rhizomatous, erect or ascending, stems (1.5) 2-6 dm tall, glabrous to more or less densely pubescent with simple hairs near the base; leaves mostly cauline, all simple, the blade mostly (1.5) 2-6 (8) cm long and 1.3-5 (7) cm wide, cordate-ovate or broader, usually sinuate-crenate, glabrous or rarely pubescent; pedicels mostly 10-20 mm long, glabrous or hairy, ascending-spreading; sepals 3-5 mm long, greenish, glabrous or sparingly hairy; petals 7-12 mm long, white, obovate-spatulate, spreading; siliques 20-35 mm long, (1) 1.5-3 mm wide, ascending to erect, valves glabrous, obscurely 1-nerved; styles 0.5-2 mm long or more; seeds 1.5 mm long or more, smooth.—Stream sides and seeps at middle to higher elevations in Beaver (US), Duchesne (US), Garfield (US), Iron, Piute, Salt Lake, San Juan (US), Sanpete (US), Sevier (US), Summit, Utah, Wasatch, Washington, Wayne (US), and Weber counties, and to be expected elsewhere; British Columbia to Wyoming south to California, Nevada, Utah, and New Mexico. Our plants is var. *cordifolia*.

*Cardamine parviflora* L. Plants annual or biennial from a taproot, stems erect, usually solitary, 1-3 dm tall, glabrous; basal leaves with 3-5 pairs of oblong to cuneate-obovate leaflets, lateral leaflets 0.2-0.4 (0.5) cm long and 0.2-0.3 cm wide, entire or slightly lobed, terminal leaflet broadly cordate to orbicular, 0.3-0.8 (1) cm long and 0.5-1 (1.2) cm wide; cauline leaves reduced upwards, mostly 2-4 cm long, with 3-6 pairs of lateral leaflets, segments similar to basal

ones only lateral leaflets slightly narrower, linear to linear-spatulate or narrowly oblong, terminal segment linear to cuneate-oblong, entire or toothed, 0.5-1.2 cm long and 0.1-0.3 cm wide, not decurrent; pedicels 3-7 mm long, spreading-ascending, glabrous; sepals 1.2-1.6 mm long, greenish, glabrous; petals 2-3 mm long, white, oblanceolate, spreading; siliques 12-30 mm long, 0.5-1 mm wide, erect or nearly so, glabrous, style 0.3-0.6 mm long; seeds 1-1.5 mm long, smooth.—Rare and local, Duchesne County; widespread and common in the eastern United States; Europe. Our plant is var. *arenicola* (Britton) O. E. Schulz.

*Cardamine pensylvanica* Muhl. ex Willd. [*C. flexuosa* ssp. *pensylvanica* (Muhl.) Schulz; *C. hirsuta* var. *pensylvanica* (Muhl.) Graff] Plants annual or biennial from a taproot, stems erect, usually solitary, 1.5-3.5 dm tall, glabrous or pubescent; basal leaves with 7-11 pairs of oval to lanceolate or oblanceolate leaflets, lateral leaflets 0.3-1.5 cm long and 0.2-1.2 cm wide, entire or lobed, terminal leaflet orbicular to cuneate-oblanceolate, 0.4-2 cm long and 0.3-1.5 cm wide; cauline leaves reduced upwards, mostly 4-8 cm long, with 3-5 pairs of lateral leaflets, segments broadly oblong to oval, terminal segment cuneate-obovate, entire or toothed, (0.5) 1-3 cm long and 0.5-2 cm wide, decurrent; pedicels 3-10 mm long, spreading-ascending, glabrous; sepals 1.2-1.8 mm long, pinkish, glabrous; petals 2-3 mm long, white, oblanceolate, spreading; siliques 15-30 mm long, 0.7-1 mm wide, erect, glabrous, style 0.4-0.8 mm long; seeds 1-1.5 mm long, smooth.—Stream sides and other moist areas at middle to low elevations in Duchesne and Summit counties; widespread in North America.

This species is only weakly distinct from *Cardamine oligosperma* Nutt. ex Torr. and Gray, and that species might better be treated as a variant of *C. pensylvanica*. The difficulty with this proposal is that *C. pensylvanica* itself may only be a minor phase of the European *C. hirsuta* L. We cannot express an opinion on the taxonomy of this species complex based upon our provincial studies, but suspect that our material might best be considered a subspecies of the Eu-

ropean plant based upon what we have seen in herbaria.

### CARDARIA Desv.

#### White-top

Plants pubescent rhizomatose perennials; leaves alternate, sinuate-dentate, auriculate-clasping; flowers in clustered (paniculate) racemes, pedicels spreading-ascending, not subtended by bracts; sepals 4, caducous; petals 4, yellow, the apex rounded; stamens

6, filaments lacking glandular processes; style slender, prominent, stigma capitate; fruit a silicle, usually broader than long, compressed at right angles to septum, indehiscent or tardily so, valves reticulately veined; seeds 1 (rarely 2) per locule.

As here defined, a genus of 4 species of Europe and Asia.

Rollins, R. C. 1940. On two weedy crucifers. *Rhodora* 42: 302-306.

1. Silicles obcordate in outline, glabrous; plants widespread and common ..... *C. draba*  
 Silicles orbicular in outline, pubescent or glabrous; plants uncommon ..... 2
- 2(1). Silicles puberulent, 1.5-2.5 mm long and about as wide ..... *C. pubescens*  
 Silicles glabrous, 3-4 mm long and about as wide ..... *C. chalepense*

*Cardaria chalepensis* (L.) Hand.-Mazz. [*Lepidium chalepense* L., *L. draba* ssp. *chalepense* (L.) Thell., *C. draba* ssp. *chalepensis* (L.) O. E. Schulz] Plants decumbent to ascending or erect, 2-6 dm tall, glabrous; leaves elliptic to oblong or lanceolate, 0.8-10 cm long, 0.3-2 cm wide, sinuate-dentate to entire, the upper sessile and auriculate; pedicels 2-8 mm long in fruit, spreading-ascending, glabrous; sepal 1.2-1.8 mm long, greenish to whitish, glabrous; petals 2-3 mm long, white, spatulate, spreading; silicles (excluding the style) 3-4 mm long, 3-4 mm wide, erect, glabrous, style 0.7-1 mm long; seeds 1 or 2. Moist soil, at 1500 to 1700 m in the Oquirrh Mountains, Salt Lake Co. (Rokich s.n. UT, BRY), and to be expected elsewhere; adventive from Europe.

*Cardaria draba* (L.) Desv. [*Lepidium draba* L.; *Cochlearia draba* (L.) L. *Physolepidium repens* Schrenk ex Fisch. and Meyer; *L. repens* (Schrenk) Boiss.; *C. repens* (Schrenk) Jarmolenko] Plants decumbent to ascending or erect, stems (1.2) 1.5-6 dm tall, puberulent to hirtellous with usually descending simple hairs; leaves elliptic to oblong, ovate, or oblanceolate, 0.9-9.8 cm long, 0.6-3.5 cm wide, sinuate-dentate to irregularly toothed, lower ones petiolate, upper sessile and auriculate, puberulent to hirtellous with usually retrorse simple hairs; pedicels 5-12 mm long in fruit, spreading-ascending, glabrous or puberulent; sepals

1.2-2 mm long, greenish, usually glabrous; petals 2-3.5 (4) mm long, white, broadly spatulate, spreading; silicles (excluding the style) 2-3.8 mm long, 3.5-5.7 mm wide, erect, glabrous, style 0.6-1.2 mm long; seeds 1-2 mm long.—Cultivated and waste places at lower elevations in Beaver, Duchesne, Juab, Salt Lake, Sanpete, Sevier, Utah, Washington, and Weber counties (and probably in most counties of the state); widespread in the United States and Canada; adventive from Europe.

*Cardaria pubescens* (C. A. Meyer in Ledeb.) Jarmolenko. [*Hymenophysa pubescens* C. A. Meyer in Ledeb.] Plant ascending to erect, stems 1.5-4 dm tall, puberulent to hirtellous with usually descending simple hairs; leaves elliptic to oblong or oblanceolate, 0.6-6 cm long, 0.3-1.5 cm wide or longer, irregularly sinuate-dentate, the lower petiolate, upper sessile and auriculate, puberulent to hirtellous with usually simple hairs; pedicels 6-10 mm long in fruit, ascending, hairy; sepals 1.8-2 mm long, greenish, hairy; petals 3.5-4 mm long, white, broadly spatulate, spreading; silicles (excluding the style) 1.5-2.5 mm long and about as wide, erect, puberulent, style 0.7-1.2 mm long.—Agricultural lands and disturbed places, Salt Lake Co., and to be expected elsewhere; widespread in the United States and Canada; adventive from Asia. Our plants are var. *elongata* Rollins.

As here defined, the genus *Cardaria* includes *Hymenophyssa*. Except for an occasional publication, this seems to be strictly an American concept as most workers in Europe and Asia prefer to distinguish between the two.

#### CAULANTHUS S. Wats.

Plants glabrous or pubescent with simple hairs, rarely with some malpighian ones, annual to perennial, from taproots; leaves alternate or mostly basal, simple, lyrate-pinnatifid, pinnatifid, toothed or subentire, petiolate or sessile and auriculate; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, white, yellow,

or chestnut-brown to purple; stamens 6, filaments lacking glandular processes; style obsolete or slender and conspicuous, stigma capitate and sometimes distinctly bilobed; fruit a sessile or subsessile silique, many times longer than broad, terete or more or less compressed, valves 1 (3)-nerved; seeds several to many, uniseriate.

A genus of 10-12 species of the western United States, and mainly of California.

Payson, E. B. 1922. A monographic study of *Thelypodium* and its immediate allies. Ann. Missouri Bot. Gard. 9:233-324.

Rollins, R. C. 1971. Protogyny in the Cruciferae and notes on *Arabis* and *Caulanthus*. Contr. Gray Herb. 201:3-10.

1. Cauline leaves sessile and auriculate at the base; plants of southwestern Utah ..... *C. cooperi*  
Cauline leaves petiolate or sessile but not auriculate; plants of broad distribution and sometimes of southwestern Utah ..... 2
- 2(1). Stems usually conspicuously inflated, glabrous or nearly so; plants perennial ... *C. crassicaulis*  
Stems not inflated; hispid (at least below); plants annual or biennial ..... 3
- 3(2). Pedicels very short, 1-2 mm long, soon recurved; siliques up to 4 cm long, descending; known only from Washington County ..... *C. lasiophyllus*  
Pedicels 3-7 mm long, spreading-ascending; siliques 4.5-13.5 cm long, ascending to curved-pendulous; known only from Millard and Tooele counties.. *C. pilosus*

*Caulanthus cooperi* (S. Wats.) Payson. [*Thelypodium cooperi* S. Wats.; *Guillenia cooperi* (S. Wats.) Greene] Plants annual, erect or sprawling, stems not inflated, 1-7.5 dm tall, glabrous and often glaucous or sparsely pubescent with simple or malpighian hairs; leaves mainly cauline, lower ones 1-7 cm long, 0.4-2 cm wide or more, obscurely sinuate-dentate, glabrous, cauline ones reduced upwardly, mostly 1-7.5 cm long and 0.2-1.2 cm wide, mostly entire with at least the uppermost auriculate; pedicels 1-4 mm long, soon recurved, glabrous; sepals 5-6.5 (7) mm long, green or reddish, glabrous; petals 6-9 mm long, yellowish, suffused with purple, narrowly spatulate, ascending; anthers 1-1.3 mm long; siliques 20-45 mm long, 2-3 mm wide, sessile, descending, compressed, glabrous; styles 1-2.5 mm long, stigma not expanded, shortly bilobed.—*Lar-*

*rea* and Joshua tree communities in Washington County, Utah; Arizona, Nevada, and California.

*Caulanthus crassicaulis* (Torr.) S. Wats. Plants perennial, erect, stems usually strongly inflated, (2) 3.2-9.7 (10.8) dm tall, glabrous and glaucous; leaves mainly basal, lower ones 3-12 (17) cm long, 0.3-3 cm wide, lyrate-pinnatifid to entire, glabrous, cauline ones much reduced upwardly, linear to narrowly oblanceolate, petiolate and not auriculate; pedicels 1-4 mm long, stout, ascending, glabrous or more commonly hirsute at least apically; sepals (7) 9-13 mm long, brown to brown-purple, narrowly spatulate, spreading-ascending; anthers 3.9-6.3 mm long; siliques 70-140 mm long, 1.5-2 mm wide, sessile, ascending to erect, glabrous; style obsolete, stigma more or less expanded, lobes up to 0.8 mm long.—

Pinyon-juniper, sagebrush, shadscale, and ponderosa pine woodlands from moderate to low elevations in the southern two-thirds of Utah; Oregon and Idaho to Colorado south to California and Arizona.

As here defined, we are treating *Caulanthus crassicaulis* in a broad sense and not recognizing *C. glaber* nor *C. major*. These three sympatric entities, segregated on features which tend to show some apparent intergradation in Utah, seem to be very dis-

tinct elsewhere, particularly in Nevada and California. The var. *crassicaulis* is reported to have a haploid number of  $n = 12$ , whereas as one of us has shown (Reveal & Styer, Southw. Naturalist 18:397-402. 1974) the var. *glaber* is  $n = 14$  based on a collection from southwestern Nevada. The two variants of the species must be carefully investigated in the field to see if the plants found outside Utah really belong to the taxa we have in the state.

1. Sepals more or less hirsute; plants of broad distribution ..... *C. crassicaulis* var. *crassicaulis*  
     Sepals glabrous or with a few hairs; plants of various distributions ..... 2
- 2(1). Stigmas deeply divided; plants common ..... *C. crassicaulis* var. *glaber*  
     Stigmas shallowly lobed; plants evidently rare ..... *C. crassicaulis* var. *major*

**Var. *crassicaulis*.** [*Streptanthus crassicaulis* Torr.; *C. senilis* Heller] Widespread and locally common in Box Elder, Carbon (US), Daggett, Duchesne, Emery, Juab, Kane, Sanpete, Sevier, and Uintah (US) counties and likely elsewhere—the type is from the east side of the Great Salt Lake; Idaho, Nevada, Colorado, Arizona, and California.

**Var. *glaber*** M. E. Jones. [*C. glaber* (M. E. Jones) Rydb.] Widespread and locally common in Beaver, Garfield, Kane, Millard, Piute, San Juan, Sevier, and Washington counties—the type is from Sink Valley in Kane County; southern Nevada.

**Var. *major*** M. E. Jones [*C. major* (M. E. Jones) Payson; *C. procerus* of authors, not S. Wats.] Rare and local, perhaps not separable from var. *glaber* in Utah where known only from Garfield County—the type is from Bromide Pass in Henry Mountains; Nevada and California where perfectly distinct from both var. *glaber* and var. *crassicaulis*.

***Caulanthus lasiophyllus*** (Hook. & Arn.) Payson. [*Turritis lasiophylla* Hook. & Arn.; *Thelypodium lasiophyllum* (Hook. & Arn.) Greene; *Sisymbrium lasiophyllum* (Hook. & Arn.) K. Brandegee; *Guillenia lasiophylla* (Hook. & Arn.) Greene] Plants annual, stems not inflated, 1-8 (12) dm tall, more or less hirsute with simple or rarely forked hairs; leaves mainly cauline, these 0.7-15 cm long, 0.1-5.5 cm wide, irregularly pinnatifid,

petiolate and not auriculate; pedicels 1-2 mm long, deflexed in fruit, glabrous or sparingly hirsute; sepals 2-3 mm long, often purplish, glabrous; petals 3-5 mm long, yellowish, oblong-spatulate, not constricted at juncture of blade and claw, ascending-spreading; anthers 0.6-1 (1.5) mm long; siliques 25-45 (60) mm long, 0.8-1.1 mm wide, sessile, terete, reflexed-descending, glabrous; styles 0.8-1.3 mm long, stigma small, obscurely lobed.—Sandy or gravelly soils in the *Larrea* community in Washington County; California and Nevada south into Arizona and Mexico. Our material has been designated as var. *utahensis* (Rydb.) Payson [*Thelypodium utahense* Rydb.; *T. lasiophyllum* var. *utahense* (Rydb.) Jeps.], basically a Mojave Desert phase which occurs in northwestern Arizona, southern Nevada, and southeastern California.

***Caulanthus pilosus*** S. Wats. [*Streptanthus pilosus* (S. Wats.) Jeps.] Plants biennial or infrequently annual, stems not inflated, mostly 4-10 dm tall or more, hirsute with simple hairs at least below; leaves mostly basal, lower ones 3-15 cm long, 0.5-3.5 cm wide, irregularly pinnatifid, hirsute, cauline ones only slightly reduced and shorter upwardly, petiolate and not auriculate; pedicels 4-9 mm long, spreading-ascending, glabrous or nearly so; sepals 5-7 (9) mm long, often purplish, glabrous or hairy; petals 7.5-9 (10) mm long, white, suffused with



purple or pink, spatulate-lanceolate, constricted at juncture of blade and claw, ascending-spreading; anthers 2-4 mm long; siliques 70-115 mm long, 0.8-1 (1.5) mm wide; style short, stigma bilobed.—Sandy or gravelly soils in the shadscale-winter fat communities of Millard and Tooele counties; Oregon and Idaho south to California and Nevada.

#### CHLOROCRAMBE Rydb.

Plants glabrous perennials from a stout caudex; leaves alternate and mainly cauline, simple, more or less hastate, entire or sinuately lobed, petiolate, not both sessile and auriculate; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, white; stamens 6, filaments lacking glandular processes; style obsolete or up to 0.5 mm long, stigma small, entire; fruit a stipitate silique, many times longer than broad, subterete, valves 1 (3-5)-nerved; seeds uniseriate.

A monotypic genus.

*Chlorocrambe hastatus* (S. Wats.) Rydb. [*Caulanthus hastatus* S. Wats.] Plants erect, stems 6-18 dm tall, usually simple, glabrous and glaucous; leaves with slender petioles 1-16 cm long, blades hastate to ovate or lanceolate, 3-13.5 cm long, 1-8.5 cm wide, more or less hastate, entire or sinuate-lobed; pedicels spreading to reflexed, 5-10 mm long, glabrous; sepals usually surpassing petals, their tips coiled, yellowish-green, glabrous; petals 4.5-8 mm long, white, mostly 4-6 mm long, blade constricted at juncture with claw, ascending-spreading; siliques 40-105 mm long, 1.8-2.5 mm wide, spreading to curved descending, glabrous, stipe 2-7 mm long; style up to 0.5 mm long, stigma not lobed.—Thickets, woodlands, and less commonly in openings from 1900 to 2800 m elevation in Davis, Salt Lake, Tooele, Utah, Wasatch, and Weber counties; known only from northern Utah and the Wallowa Mountains of northeastern Oregon.

CHORISPORA R. Br.

ex DC. Nom. Cons.

Plants stipitate-glandular and infrequently also hirsute annuals, from taproots; leaves alternate and basal, simple, sinuate-dentate

to pinnatifid or entire, cauline ones petiolate to sessile but not auriculate; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, pink to lavender; stamens 6, filaments lacking glandular processes; style apical on a slender sterile beak, stigma minute, bilobed; fruit a silique, many times longer than broad, terete, indehiscent, breaking at maturity into 1-seeded segments, valves 1 (3 or more)-nerved; seeds uniseriate.

A genus of about 9 species, mainly of central Asia.

*Chorispora tenella* (Pall.) DC. [*Raphanus tenellus* Pall.; *Chorispermum tenellum* (Pall.) R. Br. ex Ait.] Plants decumbent-ascending to erect, stems 0.2-4.5 dm tall, simple or branched from base, stipitate-glandular and often simple hirsute at least at base; leaves mainly cauline, 0.5-8.5 cm long, 0.1-2.8 cm wide, sinuate-dentate, pinnatifid, or entire, petiolate or sessile but not auriculate; pedicels spreading-ascending, 2-6 mm long, stipitate-glandular and often sparingly hirsute; sepals 4.4-6.7 mm long, reddish or purplish, stipitate-glandular; petals 9-12.5 mm long, pink to lavender, apex rounded, spreading; siliques 30-45 mm long, curved-ascending, stipitate-glandular, beak 8-22 mm long; style obsolete or very short, stigma minute.—Roadsides, foothills, and other disturbed sites at lower elevations in Box Elder, Emery, Grand, Kane, Salt Lake, Sanpete, Utah, Washington, Wayne, and Weber counties, and probably throughout the state; Washington and Idaho south to California, Arizona and Colorado; adventive from Asia.

#### CONRINGIA Adans.

Plants glabrous and glaucous annuals or biennials, from taproots; leaves alternate and basal (and still alternate), simple, entire, tapering to base or cauline sessile and auriculate-clasping; flowers racemose, pedicels ascending to curved-erect, not subtended by bracts; sepals 4, deciduous; petals 4, yellow or cream; stamens 6, filaments lacking glandular appendages; styles stout, stigma lobed; fruit a sessile, slender silique many times longer than broad, quadrangular, valves 1-3-nerved; seeds numerous, uniseriate.



About 6 species of Eurasia.

***Conringia orientalis* (L.) Dumort.** [*Brassica orientalis* L.] Hare's-ear Mustard. Plants annual or winter annual, stems 1.9-5 (7) dm tall, solitary or 2 or 3 from base, glabrous; basal leaves 3-6 (9) cm long, 1.2-3 cm wide, entire, glabrous; cauline leaves several, 1.7-12 cm long, 0.8-5.7 cm wide, ovate to oblong to elliptic, shorter to longer than internodes, glabrous, entire; pedicels 5-14 mm long, ascending to curved-erect, glabrous; sepals 4.3-6 (8) mm long, glabrous, often reddish tinged, acute; petals 6.2-10 (12) mm long, yellow to cream, spatulate, spreading-ascending; siliques 70-100 (130) mm long, 1.5-2 mm thick, erect, valves glabrous; styles up to 1 mm long, stigma small; seed numerous.—Slopes, roadsides, and other disturbed sites at middle and lower elevations in Utah and Washington counties (and to be expected elsewhere); widely distributed in North America; adventive from Europe.

**DESCURAINIA** Webb and Berthel.  
Nom. Cons.

Plants stellate-pubescent, stipitate-glandular, or glabrate annuals or biennials from slender to stout taproots; leaves basal and cauline, alternate, 1-3 times pinnately compound or pinnatifid, not auriculate basally; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, yellow to cream; stamens 6, filaments lacking glandular processes; style short or obsolete, stigma capitate; fruit a silique more than (3) 5 times longer than broad, linear to oblong or clavate, terete or nearly so, valves 1-nerved, glabrous; seeds several to many, uniseriate or biseriate.

Perhaps 30 species mainly of the Americas, a few in Europe.  
Detling, L. E. 1939. *Descurainia* in North America. Amer. Midl. Naturalist 22:481-520.  
Schulz, O. E. 1924. *Descurainia*. Pflanzenr. IV. 105 (Heft 86): 481-520.

- 1. Upper leaves bi- or tripinnate; siliques narrowly linear, mostly about 20 (10-30) mm long; seeds usually more than 20, uniseriate; replum 2-3-nerved; tall to low plants of low elevations ..... *D. sophia*  
Upper leaves once-pinnate; siliques clavate, elliptic, or, if linear, less than 20-seeded and less than 15 mm long; replum nerveless or 1-nerved ..... 2
- 2(1). Siliques clavate or linear to elliptic, rounded to pointed above; seeds often in 2 rows or at least partially so; replum usually nerveless; plants of middle to lower elevations ..... *D. pinnata*  
Siliques linear or elliptic, usually pointed above; seeds in one row; replum 1-nerved; plants of middle and higher elevations ..... 3
- 3(2). Siliques 7-14 mm long, linear or less commonly ellipsoid; pedicels appressed-erect or ascending; seeds mostly 4-10 per locule ..... *D. richardsonii*  
Siliques 3.3-7.2 mm long, ellipsoid; pedicels ascending to spreading; seeds mostly 1-3 per locule ..... *D. californica*

***Descurainia californica* (A. Gray) O. E. Schulz.** [*Smelowskia californica* A. Gray] Plants annual or winter annual to biennial, stems 4-13 dm tall or more, simple or more commonly profusely branching from most of upper leaf and bract axils, minutely dendritic-stellate pubescent to almost or quite glabrous below, glabrous above; leaves basal and cauline, 2-7 cm long, lower once-pinnately compound with 2-4 pairs of entire to incised pinnae, upper reduced, once-pinnate or pinnatifid; pedicels 3-7 mm long, spread-

ing to spreading-ascending, glabrous; sepals spreading, 0.8-1.3 mm long, yellow or greenish, glabrous; petals 1.1-1.6 mm long, yellow; siliques 3.3-7.2 mm long, 0.9-1.3 mm wide, erect or ascending, not appressed; styles 0.3-0.7 mm long; seeds uniseriate, 1-3 per locule.—Woodlands, especially in aspen but also in ponderosa pine, spruce-fir, and less commonly in mountain brush communities from 1750 to 3100 m elevation in Beaver, Carbon, Garfield, Millard, Piute, Salt Lake, Utah, Washington,

Wayne, and Weber counties; Wyoming, Colorado, and New Mexico westward to California.

This taxon is a mirror-image congener of *Descurainia richardsonii* (q.v.), especially of those taxa of that species with ascending pedicels.

*Descurainia pinnata* (Walter) Britton [*Erysimum pinnatum* Walter; *Sisymbrium pinnatum* (Walter) Greene; *Sophia pinnata* (Walter) Howell] Pinnate Tansy-Mustard. Plants annual or winter annual, stems 1-10 dm tall, stellate-pubescent and sometimes also stipitate-glandular at least below, simple or highly branched above; leaves basal and cauline, 2-10 cm long, once to

twice pinnatifid, segments linear to oblong, often toothed, upper reduced and usually once pinnatifid; pedicels 3-24 mm long, spreading, stellate-pubescent to glabrous; sepals 1-2.2 mm long, yellowish to greenish or violet, stellate-pubescent to glabrous; petals 1.5-3 mm long, cream to yellow; siliques 3-15 (rarely 20) mm long, 1-2 mm wide, clavate to oblong or linear, very rarely ellipsoid; styles up to 0.3 mm long; seeds 1-20 per locule, biseriate in part.—Widespread and common in arid to sub-mesic regions of North America; composed of numerous freely intergrading variants, several of which occur in Utah.

1. Pedicels (17) 18-24 mm long; siliques mostly 12-18 mm long; petals yellow, over 2 mm long; terminal leaflet of uppermost leaves linear, entire, and more than 2 cm long; plants of Grand, San Juan, and Uintah counties ..... *D. pinnata* var. *paysonii*  
Pedicels usually less than 15 mm long; siliques often less than 12 mm long (up to 20 mm in var. *filipes*); terminal leaflet various but not or seldom as above; petals yellow to cream, shorter or longer than 2 mm in length; distribution various ..... 2
- 2(1). Stems moderately to densely stipitate-glandular ..... 3  
Stems stellate-pubescent to glabrous, not at all stipitate-glandular ..... 4
- 3(2). Flowers with calyx usually rose-colored; corolla 1.5-2 (2.2) mm long; siliques usually 10 mm long or less ..... *D. pinnata* var. *osmiarum*  
Flowers with calyx yellowish; corolla 2-3 mm long; siliques often more than 10 mm long ..... *D. pinnata* var. *filipes*
- 4(2). Siliques usually shorter than pedicels, mostly 10-21 mm long, not or only somewhat clavate in outline ..... *D. pinnata* var. *osmiarum*  
Siliques usually subequal to or longer (rarely shorter) than pedicels, mostly 3-12 mm long, more or less clavate or elliptic in outline ..... 5
- 5(4). Siliques 3-8 mm long, borne on pedicels 4-12 mm long; plants of warm deserts in Washington County ..... *D. pinnata* var. *glabra*  
Siliques 8-10 mm long, or, if only 4-8 mm long, not of Washington County; pedicels various ..... 6
- 6(5). Pedicels 4-6 (8) mm long; flowers 1-1.5 mm long ..... *D. pinnata* var. *nelsonii*  
Pedicels (6) 8-12 mm long; flowers 2-3 mm long ..... *D. pinnata* var. *intermedia*

Var. *filipes* (A. Gray) M. E. Peck. [*Sisymbrium incisum* var. *filipes* A. Gray; *Sisymbrium longipedicellata* Fourn. *Sophia filipes* (A. Gray) Heller; *Sisymbrium gracilis* Rydb.; *D. rydbergii* var. *eglandulosa* O. E. Schulz; *D. longipedicellata* (Fourn.) O. E. Schulz; *D. longipedicellata* var. *glandulosa* O. E.

Schulz; *Sisymbrium glandifera* Osterh.; *Sisymbrium longipedicellata* var. *glandulosa* (O. E. Schulz) St. John; *D. pinnata* ssp. *filipes* (A. Gray) Detling] Common and widespread from 975 to 2300 m elevation in desert shrub, mountain brush, pinyon-juniper, and ponderosa pine communities in

Beaver, Emery, Grand, Juab, Kane, Millard, Salt Lake, San Juan, Sevier, Tooele, Utah, Washington, and Wayne counties; British Columbia and Alberta south to California, Arizona, and Colorado.

**Var. *glabra*** (Woot. & Standl.) Shinnery. [*Sophia glabra* Woot. & Standl.; *D. pinnata* ssp. *glabra* (Woot. & Standl.) Detling] Local common from 750 to 1200 m elevation in Washington County; Arizona and New Mexico west to California and northern Mexico.

**Var. *intermedia*** (Rydb.) C. L. Hitchc. [*Sophia intermedia* Rydb.; *D. intermedia* (Rydb.) F. P. Daniels; *Sisymbrium intermedium* (Rydb.) Garrett; *D. pinnata* ssp. *intermedia* (Rydb.) Detling] Locally common in pinyon-juniper, sagebrush, and semidesert shrublands from 1200 to 1850 m elevation in Garfield, Kane, Millard, Uintah, and Wayne counties; British Columbia and Alberta south to California, Nevada, Utah, and Colorado.

**Var. *nelsonii*** (Rydb.) M. E. Peck. [*Sophia nelsonii* Rydb.; *D. brachycarpa* var. *nelsonii* (Rydb.) O. E. Schulz] Widespread but apparently uncommon from 1200 to 3250 m elevation in Duchesne, Garfield, San Juan, Sevier, Uintah, and Wasatch counties; Washington east to Montana and south to Nevada, Utah, and Colorado.

**Var. *osmiarum*** (Cockerell) Shinnery. [*Sophia andrenarum* var. *osmiarum* Cockerell; *S. halictorum* Cockerell; *S. andrenarum* Cockerell; *Sisymbrium halictorum* (Cockerell) K. Schum.; *D. halictorum* (Cockerell) O. E. Schulz; *D. halictorum* var. *andrenarum* (Cockerell) O. E. Schulz; *D. halictorum* var. *osmiarum* (Cockerell) O. E. Schulz; *D. andrenarum* (Cockerell) Cory; *D. pinnata* ssp. *halictorum* (Cockerell) Detling] Our most common variant, in sagebrush, pinyon-juniper, salt-desert shrub, grasslands, and warm desert shrublands from 850 to

2450 m elevations in Box Elder, Davis, Duchesne, Emery, Garfield, Iron, Juab, Kane, Millard, Piute, San Juan, Sevier, Uintah, Utah, Washington, and Wayne counties; Oregon to Wyoming south to Mexico, Oklahoma, and Arkansas.

**Var. *paysonii*** (Detling) Welsh & Reveal, stat. nov., based on *Descurainia pinnata* ssp. *paysonii* Detling, Amer. Midl. Naturalist 22:515. 1939. Uncommon in pinyon-juniper and sagebrush zones at lower elevations in Grand, San Juan, and Uintah counties; Wyoming and Colorado south into Arizona.

***Descurainia richardsonii*** (Sweet) O. E. Schulz. [*Sisymbrium canescens* Richards., not *D. canescens* Nutt.; *S. richardsonii* Sweet; *S. canescens* var. *major* Hook.; *Sophia richardsoniana* Rydb.] Richardson Tansymustard. Plants annual or winter annual to biennial, stems (1.5) 3-12 dm tall or more, simple or more commonly profusely branching from upper leaf and bract axils, minutely dendritic-stellate pubescent and sometimes also minutely stipitate-glandular to almost or quite glabrous below, glabrous or glandular above; leaves basal and cauline, 1.5-8 cm long, the lower once- to twice-pinnatifid with 2-4 pairs of toothed or lobed or subentire pinnae, the upper reduced and only once-pinnatifid; pedicels (2.5) 3-9 mm long, spreading to erect, pubescent or glabrous; sepals spreading, 0.9-1.7 mm long, yellow or greenish, glabrous or hairy; petals 1.3-2.8 mm long, yellow; siliques 7-14 mm long, 0.8-1.2 mm wide, ascending or erect, often appressed; styles 0.2-0.6 mm long; seeds uniseriate, (1-3) 4-10 per locule.—Spruce-fir, aspen, mountain meadows, or sagebrush communities from 2150 to 2900 m elevation in central and eastern Utah; British Columbia and Alberta south to California, Arizona, and Mexico. Three weakly defined variants can be at least arbitrarily distinguished as in the following key:

- 1. Pedicels and siliques erect, more or less appressed to raceme axis ..... *D. richardsonii* var. *brevipres*  
Pedicels ascending, siliques erect or ascending, neither one appressed to  
raceme axis ..... 2
- 2(1). Plants not glandular ..... *D. richardsonii* var. *sonnei*  
Plants stipitate-glandular ..... *D. richardsonii* var. *viscosa*

**Var. *brevipes*** (Nutt. ex Torr. & Gray) Welsh & Reveal, comb. nov., based on *Sisymbrium canescens* var. *brevipes* Nutt. ex Torr. & Gray, Fl. N. Amer. 1:92. 1838. [*Sophia procera* Greene; *Sisymbrium procerum* (Greene) K. Schum; *Sophia brevipes* (Nutt.) Rydb.; *D. richardsonii* var. *macrosperma* O. E. Schulz, type from Alta, Salt Lake County; *D. richardsonii* ssp. *procera* (Greene) Detling; *D. richardsonii* var. *procera* (Greene) Breitung] Locally common from 2450 to 2900 m elevation in Duchesne, Garfield, Iron, Piute, Salt Lake, Summit, and Wasatch counties; Idaho and Montana south to New Mexico.

**Var. *sonnei*** (B. L. Robinson) C. L. Hitchc. [*Sisymbrium incisum* Engelm. in Gray; *D. incisa* (Engelm.) Britton; *S. incisum* var. *sonnei* B. L. Robinson; *Sophia sonnei* (B. L. Robinson) Greene; *Sophia incisa* (Engelm.) Greene; *Sophia leptophylla* Rydb.; *Sophia serrata* Greene; *Sophia purpurascens* Rydb; *Sisymbrium leptophyllum* (Rydb.) Nels. & Macbride; *D. serrata* (Greene) O. E. Schulz; *D. incisa* var. *leptophylla* (Rydb.) O. E. Schulz; *D. richardsonii* ssp. *incisa* (Engelm.) Detling] Widespread and locally common from 1800 to 2750 m elevation in Duchesne, Garfield, Grand, Salt Lake, Utah, and Wasatch counties; Idaho and Montana southward to Mexico.

This phase of *Descurainia richardsonii* closely simulates *D. californica* (q.v.).

**Var. *viscosa*** (Rydb.) M. E. Peck. [*Sophia viscosa* Rydb.; *Sisymbrium viscosum* (Rydb.) Blankinship; *D. rydbergii* O. E. Schulz; *D. richardsonii* ssp. *viscosa* (Rydb.) Detling] Local and common from 2450 to 2900 m elevation in Duchesne and Wasatch counties; British Columbia and Alberta south to California, Arizona, and New Mexico.

The var. *richardsonii* is known to occur just north and east of Utah in southwestern Wyoming and northwestern Colorado. It differs from var. *brevipes* in being canescent as opposed to the moderately pubescent to nearly glabrous condition of var. *brevipes*.

***Descurainia sophia*** (L.) Webb. [*Sisymbrium sophia* L.; *Sophia sophia* (L.) Britton; *Sophia parviflora* Standl.] Plants annual or infrequently winter annual, stems 1.7-8.5 (10) dm tall or more, simple or more com-

monly branched above, softly dendritic- or mixed simple- and dendritic-hairy at least below; leaves basal and cauline, 1-12 cm long, the lower 2-3 times pinnately compound to pinnatifid, with 2-6 pairs of pinnatifid pinnae, the upper ones smaller and usually twice pinnately compound or pinnatifid; pedicels 4-17 mm long, ascending, puberulent or glabrous; sepals erect, 2-3.1 mm long, yellowish, glabrous or hairy; petals 2.2-3 mm long, cream; siliques (10) 12-27 (30) mm long, 0.8-1.2 mm wide, ascending-erect; styles 0.1-0.3 mm long; seeds uniseriate, mostly 10-25 mm long.—Roadsides, corrals, agricultural lands, foothills, and other disturbed sites from 750 to 2450 m elevation in Beaver, Emery, Garfield, Grand, Juab, Millard, San Juan, Summit, Uintah, Washington, and Weber counties, and probably cosmopolitan in Utah; widespread in North America; adventive from Europe.

#### DIPLOTAXIS DC.

Plants glabrous or simple-hirsute annuals or biennials, from taproots; leaves alternate, mostly basal, pinnatifid to irregularly toothed, reduced upwards and petiolate to merely sessile but not auriculate; pedicels ascending or ascending-spreading, not subtended by bracts; sepals 4, deciduous; petals 4, yellow or sometimes fading rose; stamens 6, filaments lacking glandular processes; styles stout, well developed, stigma capitate; fruit a silique, many times longer than broad, linear, somewhat flattened parallel to partition, valves 1-3-nerved, beak not nerved; seeds numerous, biseriate.

A genus of perhaps 20 species of Eurasia.

***Diplotaxis muralis*** (L.) DC. [*Sisymbrium murale* L.] Plants erect or ascending, pubescent with coarse, descending hairs at least below, stems 0.7-5 dm tall, usually branched; basal leaves lyrate-pinnatifid to irregularly lobed, mostly 2.5-9.5 cm long, 0.5-3.5 cm wide; cauline leaves usually much reduced upwards, all petiolate, not auriculate; pedicels 6-23 mm long or more, slender, ascending to spreading-ascending, often hirsute; sepals 3-4.5 mm long, purplish tinged, glabrous or hirsute; petals 4.5-7.5 mm long, yellow or sometimes fading rose;

siliques 17-33 mm long, 1.5-2.8 mm wide; style 1.5-2.5 mm long, valves glabrous, lightly 1-3-nerved.—Fields and disturbed sites in Cache County, and to be expected elsewhere; scattered in North America; adventive from Europe.

# DITHYREA HARV.

Plants stellate or dendritic hairy, annuals or winter annuals, from taproots; leaves alternate, simple, subentire to toothed, lobed or pinnatifid, petiolate to sessile but not auriculate; flowers racemose, pedicels spreading, not subtended by bracts; sepals 4, deciduous; petals 4, white; stamens 6, filaments lacking glandular processes; style broad and stout, stigma enlarged-capitate; fruit a silicle, more than twice longer than broad, spectaclelike, compressed at right angles to the replum, valves reticulately veined; seeds 1 per locule.

A genus of 2 species of western North America.

*Dithyrea wislizenii* Engelm. in Wisliz. Spectacle-pod. Plants erect or ascending, pubescent with soft stellate or dendritic hairs, stems 0.7-5 dm tall, simple or branched; basal leaves often withered by anthesis; cauline leaves 1.2-9.5 cm long, 0.2-2.5 cm wide, pinnatifid, sinuately dentate, irregularly lobed, or entire, moderately to densely hairy like stems, reduced upwards; pedicels 5-21 mm long in fruit, spreading, dendritic hairy; sepals 3-5.5 mm long, greenish, yellowish, or purplish, usually dendritic hairy; petals 4.8-8 mm long, white, claws occasionally lavender, blades orbicular to spatulate, 2.5-5.5 mm wide; silicles 4-6.5 mm long (from apex of the short stipe), 9-14 mm wide, valves pubescent; seeds 1 per locule.—Sandy sites in warm desert shrub,

# DRABA L.

Plants with stellate, dendritic, forked, or simple hairs, or glabrate, annual, biennial, or perennial, from taproots and often with grassland, and pinyon-juniper communities from 750 to 1700 m elevation in Emery, Garfield, Grand, Kane, San Juan, and Washington counties; Colorado, Oklahoma, and Texas westward to Utah and Arizona.

There is much variation in leaf form, but this does not seem to be correlated with other features or with ecological variations. well-developed caudices; leaves all basal or some cauline, alternate, simple, entire or toothed, tapering to the base or rounded, not auriculate; flowers racemose, pedicels usually not subtended by bracts; sepals 4, deciduous; petals 4, white, yellow or cream, apex rounded to bifid; stamens 6, filaments lacking glandular processes; style obsolete to prominent and slender, stigma obscurely bilobed; fruit a silicle or infrequently a short silique, mostly 1-10 times longer than broad, ovate to ovate, lanceolate or linear, compressed parallel to septum, plane or twisted, straight or curved, valves obscurely 1-nerved or nerveless; seeds biseriate, usually numerous.

A genus of 250 to 300 species mainly of the northern temperate region of the world. Hartman, R. L., et al. 1975. Biosystematics of *Draba cuneifolia* and *D. platycarpa* (Cruciferae) with emphasis on volatile and flavonoid constituents. *Brittonia* 27:317-327.

Hitchcock, C. L. 1941. A revision of the drabas of western North America. *Univ. Wash. Publ. Biol.* 11:1-132.

Payson, E. B. 1917. The perennial scapose drabas of North America. *Amer. J. Bot.* 4:253-267.

1. Plants scapose, leaves all basal, mostly depressed-cespitose perennials (except in *D. verna* which has deeply bilobed petals) ..... KEY I.
- Plants with one to many cauline leaves in addition to basal ones, annual (and the petals not bilobed), biennial, or perennial plants ..... KEY II.

## Key I. Plants scapose

1. Plants annual, flowering in springtime; style scarcely if at all evident (up to 0.1 mm long) ..... *D. verna*



Plants perennial, flowering in springtime and in summer; styles 0.15-2.5 mm long .....	2
2(1). Petals white .....	3
Petals yellow .....	6
3(2). Plants pubescent throughout with doubly pectinate hairs; known only from Daggett County .....	<i>D. oligosperma</i>
Plants variously hairy, but either stellate or with simple or forked hairs only, seldom or nearly pubescent throughout; known from Uinta and Wasatch mountains and plateaus of southern Utah .....	4
4(3). Leaves with simple hairs only; petals 2-3 mm long; styles up to 0.2 mm long .....	<i>D. fladnizensis</i>
Leaves variously pubescent; petals mostly 3-5 mm long; styles 0.2-0.5 mm long .....	5
5(4). Leaves cinereous with appressed hairs, sometimes stellate; plants of high elevations in Wasatch and Uinta mountains .....	<i>D. lonchocarpa</i>
Leaves glabrous above and below, ciliate with simple or forked hairs; plants of plateaus of southern Utah .....	<i>D. subalpina</i>
6(2). Leaves glabrous or with unforked hairs only, often merely ciliate .....	7
Leaves pubescent, at least some of the hairs forked, stellate, or doubly pectinate .....	9
7(6). Styles 1-2.5 mm long; petals 5-6 mm long; plants of Box Elder and Weber counties .....	<i>D. maguirei</i>
Styles usually less than 1 mm long; petals less than 5 mm long; distribution various .....	8
8(7). Styles not over 0.2 mm long; plants biennial or short-lived perennial, leaves not densely imbricated; petals 1.5-3 mm long .....	<i>D. crassifolia</i>
Styles 0.2-1 mm long; plants perennial, densely cespitose, with closely imbricated leaves; petals often more than 3 mm long .....	<i>D. densifolia</i>
9(6). Lower side of leaves (at least) with appressed, pectinately branched hairs; plants of Wasatch and Uinta mountains .....	<i>D. oligosperma</i>
Lower side of leaves glabrous or pubescent, but, if so, with merely stellate or forked hairs, not pectinate .....	10
10(9). Leaves almost glabrous, ciliate with forked or dendritic hairs; plants of Box Elder and Weber counties .....	<i>D. maguirei</i>
Leaves more or less pubescent on one or both surfaces .....	11
11(10). Stems glabrous, at least above .....	12
Stems pubescent throughout .....	13
12(11). Basal leaves 1-3.5 cm long, 0.3-1 cm wide; silicles 7-14 mm long, 2-4 mm wide; plants of Washington County .....	<i>D. asprella</i>
Basal leaves 0.6-1.2 cm long, 0.9-1.4 cm wide; siliques 4-10 mm long, 1.5-3 mm wide; plants of Cache County .....	<i>D. maguirei</i>
13(11). Leaves densely cinereous pubescent, individual hairs almost indistinguishable; known from Uinta Mountains .....	<i>D. ventosa</i>
Leaves not densely cinereous pubescent, individual hairs apparent; plants of Garfield and Piute counties .....	<i>D. sobolifera</i>

# Key II.

## Plants with 1 or more cauline leaves

1. Plants annual; styles obsolete or rarely up to 0.2 mm long ..... 2  
Plants biennial or perennial; styles mostly 0.2-1 mm long or more ..... 7
- 2(1). Upper portion of stem, including pedicels, pubescent ..... 3  
Upper portion of stem glabrous ..... 4
- 3(2). Flowers white; plants widely distributed at low elevations ..... *D. cuneifolia*  
Flowers yellow; plants of montane regions in northern Utah ..... *D. rectifructa*
- 4(2). Upper leaf surfaces usually glabrous; cauline leaves 1 or 2, rarely lacking ....  
..... *D. crassifolia*  
Upper leaf surfaces usually pubescent; cauline leaves 1-5 or more ..... 5
- 5(4). Petals white; leaves entire or nearly so; silicles less than 2 mm wide; plants  
of low elevations ..... *D. reptans*  
Petals yellow, sometimes fading whitish; silicles at least 2 mm wide or the  
plants of montane places ..... 6
- 6(5). Pedicels usually at least 1.5 times longer than the silicles; plants usually of  
low elevations ..... *D. nemorosa*  
Pedicels rarely up to 1.5 times longer than the silicles; plants usually of  
montane places ..... *D. stenoloba*
- 7(1). Petals white; plants of high elevations ..... 8  
Petals yellow or cream, sometimes fading whitish; plants of low to moder-  
ate or high elevations ..... 10
- 8(7). Styles obsolete or nearly so, less than 0.2 mm long ..... *D. fladnizensis*  
Styles 0.2-0.8 mm long ..... 9
- 9(8). Silicles glabrous or merely ciliate; cauline leaves 1 or 2 ..... *D. lonchocarpa*  
Silicles pubescent on valves; cauline leaves 1-10 ..... *D. lanceolata*
- 10(7). Cauline leaves solitary; plants of low elevations, restricted to Washington  
County ..... *D. asprella*  
Cauline leaves usually 2-20, or if solitary then not of Washington County;  
plants not or rarely of Washington County ..... 11
- 11(10). Styles obsolete or nearly so, up to 0.2 mm long ..... *D. stenoloba*  
Styles 0.2-2.5 mm long ..... 12
- 12(11). Petals 2.8-3.8 mm long; pubescence of leaves stiff, stalked, 2-5-rayed hairs;  
silicles pubescent with simple or stalked and forked hairs ..... *D. brachystylis*  
Petals (3/8) 4-8 mm long; pubescence of leaves various; silicles glabrous or  
pubescent with stellate to simple hairs ..... 13
- 13(12). Leaf surfaces glabrous, ciliate or margins smooth; silicles glabrous ..... *D. crassa*  
Leaf surfaces with stalked 2-4-rayed, forked, or simple hairs, margins ci-  
liate or not; silicles glabrous or hairy ..... 14
- 14(13). Leaves solitary, subtending lowermost flower or branch of inflorescence;  
plants of Box Elder County ..... *D. incerta*  
Leaves 2-20; plants of various distribution ..... 15
- 15(14). Leaves bright green to somewhat grayish; cauline leaves often denticulate;

silicles plane or slightly contorted; plants of Grand and San Juan counties

..... *D. spectabilis*

Leaves grayish-green; cauline leaves entire; silicles usually contorted; plants

of broad distribution ..... *D. aurea*

*Draba asprella* Greene. Plants perennial, cespitose, stems 0.5-1.4 (2) dm tall, arising from a branching caudex, hirsute with mixed simple and forked to dendritic hairs; leaves all basal, rarely with one cauline, 1-3.5 cm long, 0.3-1 cm wide, oblanceolate to spatulate, entire or obscurely denticulate, green, surfaces more or less pubescent with usually stalked and 4-rayed hairs; racemes simple, 10-30-flowered, elongating in fruit; pedicels 3-15 mm long, ascending, glabrous; sepals 1.8-2.5 mm long, greenish, stellate-hairy; petals 3.4-5 (6) mm long, yellow to yellow-orange, obovate-spatulate, rounded; silicles 7-14 mm long, 1.5-4 mm wide, lance-elliptic, glabrous or ciliate; styles 0.8-1.1 mm long; seeds 12-20.—Talus slopes and low hills from 1050 to 1700 m elevation in Zion Canyon and south of St. George (Higgins s.n., 12 Apr 1961; DIX), Washington County; Arizona. Our material belongs to var. *zionensis* (C. L. Hitchc.) Welsh & Reveal, stat. & comb. nov., based on *Draba zionensis* C. L. Hitchc., Univ. Wash. Publ. Biol. 11:49. 1941. The var. *asprella* is restricted to Arizona.

*Draba aurea* Vahl in Hornem. [*D. luteola* Greene; *D. surculifera* A. Nels.; *D. aureiformis* Rydb.; *D. uber* A. Nels.; *D. mccallae* Rydb.; *D. decumbens* Rydb.; *D. aurea* var. *luteola* (Greene) O. E. Schulz; *D. aurea* var. *aureiformis* (Rydb.) O. E. Schulz; *D. aurea* var. *decumbens* (Rydb.) O. E. Schulz; *D. aureiformis* var. *leiocarpa* Payson & St. John] Plants perennial, not cespitose, stems 7-4 (5) dm tall, simple or few from a branching caudex, pubescent throughout with simple hairs often intermixed with forked ones; basal leaves 0.8-4 cm long, 0.2-1.3 cm wide, oblanceolate, entire or serrulate, green or grayish, surfaces pubescent with stalked 4-rayed hairs; cauline leaves mostly 3-20, lanceolate to ovate or oblanceolate, 0.5-3 cm long, 0.3-1.2 cm wide, entire or less commonly denticulate, pubescent like the basal ones; racemes simple or branched, several- to many-flowered, much

elongating in fruit; pedicels 3-15 (20) mm long, ascending to erect, pubescent; sepals 2-3.5 mm long, greenish, pubescent; petals (3.5) 4-6 mm long, yellow, spatulate to obovate, rounded to emarginate; silicles 8-17 mm long, plane or more commonly contorted, 2-4 mm wide, ovate-lanceolate to lanceolate or elliptic, pubescent with simple, branched, or stellate hairs; styles (0.3) 0.8-1.3 (1.5) mm long; seeds 20-50.—Woodlands, grasslands, and among shrubs from 2300 to 3800 m elevation in Beaver, Carbon, Daggett, Duchesne, Garfield, Piute, Salt Lake, San Juan, Sevier, Summit, Uintah, and Utah counties; Alaska and Yukon east to Labrador and Greenland, south to Arizona and New Mexico. This is a highly variable taxon in our region.

*Draba brachystylis* Rydb. Plants (annual) biennial or short-lived perennial, not cespitose, stems (1) 1.3-2.5 (3) dm tall, usually branched, pubescent throughout with simple, branched, or stellate hairs; basal leaves 1-5.3 cm long, 0.3-1.5 cm wide, oblanceolate, entire or denticulate, surfaces pubescent with stalked 2-5-rayed hairs; cauline leaves (1) 2-8, ovate to obovate, elliptic, or lanceolate, 0.6-2.8 cm long, 0.2-1.1 cm wide, denticulate to entire, pubescent like the basal ones; racemes simple or branched, several- to many-flowered, elongating in fruit; pedicels 1-10 mm long, spreading to spreading-ascending, pubescent; sepals 2-2.7 mm long, yellowish, pubescent; petals 2.8-3.8 mm long, yellow, spatulate, rounded to emarginate; silicles (7) 10-15 mm long, 2-3.5 mm wide, plane, obliquely oblong-elliptic, pubescent with simple and branched hairs; styles 0.4-0.8 mm long; seeds 20-30.—Woodlands and shrublands from 1675 to 2130 m elevation in Salt Lake and Utah counties; Spring Mountains, Clark County, Nevada. This is a poorly known and rarely collected plant with affinities to both *D. aurea* and *D. rectifructa*. The type is from the Wasatch Mountains.

*Draba crassa* Rydb. [*D. chrysanth* var. *crassa* (Rydb.) O. E. Schulz] Plants perennial, not caespitose, stems 0.8-1.8 dm tall, arising from a thickened caudex clothed with numerous marcescent leaf-bases, moderately hairy with simple or branched hairs, at least below; basal leaves 1.5-8 cm long, 0.3-1.2 cm wide, elliptic to oblanceolate, entire or obscurely toothed, glabrous or merely ciliate; cauline leaves 2-8, ovate to elliptic or obovate, 0.5-2 cm long, 0.2-0.8 cm wide, entire or nearly so, usually glabrous; racemes few- to many-flowered, elongating in fruit; pedicels 3-10 mm long, ascending, softly villous; sepals 2.3-3 mm long, greenish, suffused with purple, pubescent; petals 4-8 mm long, yellow, obovate, rounded; silicles 8-15 mm long, 2.5-4 (5) mm wide, plane or contorted, ovate to lanceolate or elliptic, glabrous; styles 0.8-1.2 mm long; seeds 14-26.—Alpine tundra from 3500 to 3800 m elevation in the Uinta Mountains of Summit County but to be expected in Daggett, Duchesne, and Uintah counties; Montana, Wyoming, and Colorado.

*Draba crassifolia* R. Graham. [*D. parryi* Rydb.; *D. crassifolia* var. *parryi* (Rydb.) O. E. Schulz] Plants (annual) biennial or short-lived perennial, not caespitose, stems 0.2-1.2 (2) dm tall, arising from a resolute tuft of leaves, usually glabrous except for a few hairs near base; basal leaves 0.3-1.5 (2.3) cm long, 0.1-0.3 cm wide, narrowly spatulate, entire, surfaces usually glabrous, sometimes ciliate; cauline leaves lacking or 1 or 2, very small; racemes 2- to several-flowered, congested or elongating in fruit; pedicels 2-10 mm long, curved-ascending, glabrous; sepals 1-1.4 mm long, greenish, glabrous; petals 1.7-2.5 mm long, yellow but rarely

fading white, elliptic-spatulate, emarginate; silicles 5-10 mm long, 1.5-2.5 mm wide, plane, glabrous, lance-elliptic; styles up to 0.5 mm long; seeds 10-60.—Alpine tundra from 3050 to 3800 m elevation in Duchesne (US), Grand, Piute, Salt Lake, San Juan, Sanpete (US), Sevier, and Summit counties; widespread from Alaska and Yukon east to Greenland and south to California, Arizona, and Colorado; Europe. This entity apparently grades with some phases of *D. stenoloba* in Utah, from which it is difficult, if not impossible, to segregate all specimens.

*Draba cuneifolia* Nutt. ex Torr. & Gray. Plants annual, not caespitose, 0.1-1.5 (2) dm tall, very short leafy stems arising from a taproot, simple or branched, more or less dendritic-hairy throughout; basal leaves 0.5-4 cm long, 0.2-2.7 cm wide, suborbicular to oblanceolate or cuneate-spatulate, dentate to entire, surfaces hirsute with stalked 2-4-rayed hairs, sometimes intermixed with simple hairs; cauline leaves few to several, usually much reduced, pubescent like the basal ones; racemes 3- to many-flowered, congested or elongating in fruit; pedicels 1-7 mm long, spreading to ascending, dendritic-hairy; sepals 1.5-2.5 mm long, greenish, pubescent; petals 3-4.5 (5) mm long, occasionally small or even lacking in cleistogamous flowers, white, spatulate, rounded to emarginate; silicles 4-13 (15) mm long, 1.8-3.8 (5) mm wide, plane, strigose, oblong-elliptic; styles up to 0.2 mm long; seeds 20 or more.—Warm desert shrublands upwards to mountain brush, pinyon-juniper, and ponderosa pine communities, from 750 to 2300 m elevation in much of Utah; Washington and Idaho south to Mexico, Texas, and Arkansas. Two varieties are present.

- 1. Racemes compact in fruit, seldom half as long as plant height ..... *D. cuneifolia* var. *cuneifolia*  
Racemes much elongated in fruit, commonly at least half plant height ..... *D. cuneifolia* var. *platycarpa*

**Var. *cuneifolia*.** [*D. helleri* Small; *D. amophila* Heller; *D. cuneifolia* var. *helleri* (Small) O. E. Schulz; *D. cuneifolia* var. *leiocarpa* O. E. Schulz] This is our common variant, being in Beaver, Box Elder, Grand,

Kane, Millard, San Juan, Sevier, Uintah, Utah, and Washington counties; Colorado west to California and south to Mexico and Texas.

**Var. *platycarpa*** (Torr. & Gray) S. Wats.

[*D. platycarpa* Torr. & Gray; *D. viperensis* St. John] Our few specimens from Washington County are tentatively assigned to this taxon, but they differ *inter alia* in having longer and narrower silicles; Arkansas westward to California, north to Washington.

*Draba densifolia* Nutt. ex Torr. & Gray. Plants perennial, pulvinate-cespitose and matted, scapose, arising from compacted caudex branches clothed with marcescent leaf-bases, scapes 0.5-1.5 dm tall, glabrous to pubescent throughout; leaves 0.2-0.9 cm long, mostly 0.1-0.3 cm wide, oblong to oblanceolate, surfaces glabrous or with few-forked or dendritic hairs beneath, more or less ciliated with stiff, coarse, simple or

forked hairs; racemes 2- to 10 (or more)-flowered, not elongated in fruit; pedicels 0.5-2 mm long, ascending, glabrous; sepals 2-3 mm long, greenish, glabrous or pubescent; petals 2-6 mm long, yellow, obovate, truncate to emarginate; silicles 2-7 mm long, 2-3.5 mm wide, ovate to elliptic, glabrous; styles 0.2-1 mm long; seeds 2-12.—Alpine tundra from 3050 to 3800 m elevation of Wasatch and Uinta mountains in Daggett, Duchesne, Salt Lake, Summit, and Uintah counties; British Columbia and Montana south to California, Nevada, Utah, and Wyoming. Two weakly defined, sympatric variants are recognized.

1. Styles 0.2-0.5 mm long; plants glabrous except for cilia of the leaves ..... *D. densifolia* var. *daviesiae*  
 Styles 0.5-1 mm long; plants sometimes hairy on the lower leaf surfaces and  
 on the scape ..... *D. densifolia* var. *densifolia*

Var. *daviesiae* (C. L. Hitchc.) Welsh & Reveal, comb. nov., based on *Draba apiculata* var. *daviesiae* C. L. Hitchc., Univ. Wash. Publ. Bot. 17(2):489. 1964. [*D. apiculata* C. L. Hitchc.] This is a poorly differentiated phase of alpine sites in Duchesne, Salt Lake, Summit, and Uintah counties; Wyoming, Montana. The type of *D. apiculata* is from LaMotte Peak, Uinta Mountains, Utah.

Var. *densifolia*. [*D. glacialis* var. *pectinata* S. Wats.; *D. mulfordae* Payson; *D. nelsonii* Macbride & Payson; *D. globosa* Payson; *D. sphaerula* Macbride & Payson; *D. pectinata* (S. Wats.) Rydb.; *D. caeruleomontana* Payson & St. John; *D. caeruleomontana* var. *piperi* Payson & St. John; *D. densifolia* f. *nelsonii* (Macbride & Payson) O. E. Schulz; *D. globosa* var. *sphaerula* (Macbride & Payson) O. E. Schulz] This is the common phase of the species in alpine sites of Daggett, Duchesne, Salt Lake, Summit, and Uintah counties; distribution of the species.

*Draba fladnizensis* Wulfen in Jacq. [*D. pattersonii* O. E. Schulz; *D. pattersonii* var. *hirticaulis* O. E. Schulz; *D. pattersonii* var. *dasycarpa* O. E. Schulz] Plants perennial, not cespitose, stems 0.2-0.9 dm tall, glabrous or pubescent at least near the base with simple or forked hairs; basal leaves

0.3-1 cm long, 0.1-0.2 cm wide, oblanceolate, surfaces glabrous or moderately hairy with 1-2-forked hairs, ciliate; cauline leaves 1 or 2, greatly reduced; racemes 3- to several-flowered; pedicels 1-3 mm long, ascending to spreading, glabrous; sepals 1.2-1.8 mm long, greenish, glabrous; petals 1.8-2.5 mm long, white (rarely pink), spatulate, rounded to retuse; silicles 3-6 mm long, 1.2-2 mm wide, oblong-ovate, glabrous; styles essentially lacking; seeds 10-20.—Alpine tundra in Uinta and La Sal mountains above 3100 m elevation in Daggett (?), Grand, San Juan, and Uintah (?) counties; Alaska to Mackenzie south to Colorado and Utah. Our material is difficult to interpret from the dwarf alpine specimens of *D. stenoloba* (q.v.), but apparently the white petals are diagnostic.

*Draba incerta* Payson. [*D. laevicapsula* Payson; *D. incerta* var. *laevicapsula* (Payson) Payson & St. John] Perennial, cespitose but loosely so, 0.2-1.5 (2) dm tall, stems pubescent with stellate or dendritic and sometimes simple hairs; basal leaves 0.5-1.8 (2.5) cm long, 0.1-0.3 cm wide, narrowly oblanceolate, surfaces with at least some doubly pectinate hairs, often intermixed with other types of pubescence, margin ciliate with simple to pectinately branched



hairs; cauline leaves 1 or lacking; racemes 5- to many-flowered, elongating in fruit; pedicels 2-12 mm long, ascending, usually hairy; sepals 2.5-3.5 mm long, greenish or suffused with purple, pubescent; petals 4-5.5 mm long, yellow but fading cream, cuneate-obovate, broadly emarginate; siliques 6-10 mm long, 2.5-3.5 mm wide, ovate to lanceolate, plane, pubescent or glabrous; seeds 8-14.—Alpine sites above 3050 m elevation in Raft River Mountains of Box Elder County; Alaska and Yukon south to Washington, Utah, and Wyoming.

*Draba lanceolata* Royle. [*D. cana* Rydb.; *D. valida* Goodding] Plants perennial, loosely caespitose, caudex simple or branched, stems 0.5-3.5 dm tall, pubescent throughout with soft many-branched hairs; basal leaves 0.5-4 cm long, 0.1-0.4 cm wide, oblanceolate, entire, pubescent of overlapping, stellate or branched hairs; cauline leaves several, commonly toothed; racemes several- to many-flowered, sometimes with solitary flowers in upper leaf axils; pedicels 2-9 mm long, erect, usually appressed to rachis, pubescent; sepals 1.5-2 mm long, sparsely pilose; petals 2.2-4 mm long, white, cuneate-obovate, more or less emarginate; siliques 5-12 mm long, 1.5-2.5 mm wide, narrowly lanceolate to oblong, plane or contorted, softly pubescent, rarely glabrous; styles 0.2-0.8 mm long; seeds 20 or more.—Alpine meadows and krumholz in the Uinta and

Henry mountains mostly above 3000 m elevation, in Daggett, Duchesne, Garfield, Summit, and Uintah counties; Alaska and Yukon south to Nevada, Utah, and Colorado. The type of *D. valida* is from Dyer Mine, Uintah County.

*Draba lonchocarpa* Rydb. Plants perennial, loosely to densely caespitose, caudex usually branched, scapose or rarely with one cauline leaf, scape 0.1-1.2 dm tall, glabrous or pubescent with soft many-branched hairs; leaves 0.5-1.5 cm long, 0.1-0.4 cm wide, pubescent with usually overlapping or stellate, rarely some simple, hairs, marginal pubescence entirely stellate or with some simple hairs; racemes 3-12-flowered, contracted or elongating in fruit; pedicels 1-6 (11) mm long, ascending to erect, glabrous; sepals 1.5-2 mm long, glabrous or pubescent; petals 2.5-4 mm long, white; siliques 5-14 mm long, 1-2 mm wide, linear to lance-linear or oblong, plane or twisted, glabrous or pubescent; styles 0.2-0.5 mm long; seeds 8-30.—Alpine tundra in Wasatch and Uinta mountains; Alaska and Yukon south to Oregon, Utah, and Colorado. Our material has been treated as portions of an expanded *D. nivalis* Lilj., from which it differs in technical features of pubescence and silicle characteristics. Two sympatric variants have been designated among the Utah material.

1. Siliques mostly less than 7 mm long, elliptic to linear ..... *D. lonchocarpa* var. *exigua*  
Siliques mostly more than 10 mm long, linear to narrowly elliptic .....  
..... *D. lonchocarpa* var. *lonchocarpa*

**Var. *exigua*** O. E. Schulz. [*D. nivalis* var. *exigua* (O. E. Schulz) C. L. Hitchc.] Alpine tundra in Uinta and La Sal mountains of Duchesne, Grand, and Summit counties; Wyoming and Colorado.

**Var. *lonchocarpa*.** [*D. nivalis* var. *elongata* S. Wats.; *D. lonchocarpa* var. *dasycarpa* O. E. Schulz; *D. lonchocarpa* var. *vestita* O. E. Schulz; *D. lonchocarpa* var. *semitonsa* St. John] Alpine sites from 3050 to 3900 m elevation in the Wasatch, Uinta, and La Sal mountains of Cache, Duchesne, Grand, Salt Lake, San Juan, and Summit counties; Alaska south to Oregon, Utah, and Wyoming.

***Draba maguirei*** C. L. Hitchc. Plants perennial, caespitose, with substoloniferous branches, scapose, scapes 0.2-2 dm tall, glabrous or with a few forked hairs near base; leaves 0.3-1.5 cm long, 0.1-0.4 cm wide, oblong-oblanceolate to obovate-oblanceolate, surfaces glabrous or nearly so, ciliate with simple, forked, or 4-rayed, shortly stalked hairs; racemes few- to several-flowered, elongating in fruit; pedicels 2-10 (15) mm long, ascending, glabrous; sepals 2-3 mm long, yellowish, glabrous; petals 4.5-6 mm long, yellowish, spatulate, rounded; siliques 4-9 mm long, 2-3.5 mm wide, ovate to lanceolate, oblique, glabrous or scab-

rulous; styles 1-1.5 mm long; seeds 2-8.— Talus slopes and rocky outcrops from 2600 to 2900 m elevation in northern Utah. Two

tenuous and somewhat arbitrary varieties have been designated.

- 1. Hairs of leaves all simple or rarely some forked ..... *D. maguirei* var. *burkeri*  
Hairs of leaves all branched, mostly 4-rayed ..... *D. maguirei* var. *maguirei*

**Var. *burkeri*** C. L. Hitchc. Cottonwood Canyon, Wellesville Mountains, Box Elder County (type locality), and mountains east of Ogden, Weber County; endemic.

**Var. *maguirei***. Apparently restricted to the Bear River Range, Cache County (type from Mt. Naomi); endemic.

***Draba nemorosa*** L. [*D. dictyota* Greene] Annual, from a slender taproot, stems simple or branched, 0.5-2.5 dm tall, pubescent with mixed forked and stellate hairs, or less commonly with some simple ones, or even glabrate; leaves 0.3-3 cm long, 0.2-0.8 cm wide, oblanceolate to lanceolate, ovate or oblong, entire or toothed, pubescent with branched or simple hairs; racemes few-to many-flowered, much elongating in fruit; pedicels 5-25 mm long, spreading-ascending, glabrous; sepals 1-1.5 mm long, green to yellowish or suffused purple, pilose to glabrous; petals 1.2-4 mm long, yellow to white; silicles 4-10 mm long, 1.5-3 mm wide, oblong to oblanceolate or elliptic, plane, glabrous; styles obsolete; seeds 25 or more.— Roadsides, foothills, and dry exposed sites from 1375 to 2250 m elevation in Box Elder, Cache, Salt Lake, Summit, Uintah, Utah, Weber, and perhaps all other coun-

ties; common throughout much of North America and Eurasia.

***Draba oligosperma*** Hook. Perennial, caespitose, the caudex much branched, scapose, the scapes 0.1-1 dm tall, pubescent throughout with pectinate or stellate hairs or glabrous, at least below; leaves 0.3-1.2 cm long, 0.1-0.2 cm wide, linear to spatulate or oblong, surfaces (one or both) pubescent with sessile, appressed, doubly pectinate-branched hairs, commonly ciliate with at least some pectinately branched hairs; racemes 2–15-flowered, only moderately elongating in fruit; pedicels 1-10 mm long, ascending, glabrous or pubescent; sepals 1.5-2.5 mm long, yellowish, pubescent; petals 3-5 mm long, yellow or white, obovate, rounded to emarginate; silicles 3-8 mm long, 2-4 mm wide, ovate to oval or oblong, plane, glabrous to pubescent; styles 0.1-1.2 mm long; seeds 2-10.— Ponderosa pine and Douglas fir woodlands upwards to alpine tundra in the Wasatch and Uinta Mountains from 2290 to 3800 m elevation; British Columbia and Alberta south to California, Utah, and Wyoming. Two varieties are known.

- 1. Petals yellow; pubescence of silicles, when present, of simple or forked hairs only; plants widespread ..... *D. oligosperma* var. *oligosperma*  
Petals evidently white; pubescence of silicles at least in part of doubly pectinate hairs; plants of Daggett County ..... *D. oligosperma* var. *pectinipila*

**Var. *oligosperma***. [*D. oligosperma* var. *andina* (Nutt.) ex Torr. & Gray; *D. andina* (Nutt.) A. Nels.; *D. saximontana* A. Nels.; *D. oligosperma* var. *microcarpa* Blankinship; *D. oligosperma* var. *saximontana* (A. Nels.) O. E. Schulz; *D. oligosperma* var. *leiocarpa* O. E. Schulz. Widespread in the Wasatch and Uinta mountains in Cache, Daggett, Duchesne, Summit, Uintah, and Utah counties; range of the species.

**Var. *pectinipila*** (Rollins) C. L. Hitchc.

[*D. pectinipila* Rollins] Vicinity of Flaming Gorge, Daggett County, where possibly extirpated; Wyoming.

***Draba rectifruca*** C. L. Hitchc. [*D. montana* S. Wats., not Bergeret] Annual, from a slender taproot, stems simple or branched, 1-2.2 dm tall, pubescent throughout although sparsely so above in some with branched and/or simple hairs; leaves 0.5-3 cm long, 0.1-0.7 cm wide, lanceolate to oblanceolate, entire, pubescent with branched

and simple hairs intermixed; racemes several- to many-flowered, much elongating in fruit; pedicels 2-6 mm long, spreading to curved-ascending, pubescent; sepals 1.2-1.7 mm long, greenish, pubescent; petals 2-4 mm long, yellow, narrowly spatulate, usually emarginate; silicles (4) 6-10 mm long, 2-2.5 mm wide, obliquely oblong, pubescent; styles obsolete; seeds 40 or more.—Roadsides, foothills, meadows, and woodlands, mostly from 2200 to 3050 m elevation in Carbon, Duchesne, Garfield, Grand, Piute, Salt Lake, and Wasatch counties (and to be expected elsewhere); Colorado, New Mexico, and Arizona.

*Draba reptans* (Lam.) Fern. Annual, from a slender taproot, 0.2-1 (2) dm tall, very short leafy stem simple or sometimes branched, pubescent with simple to stellate hairs below, glabrous above; basal leaves 0.3-1.8 cm long, 0.1-1 cm wide, spatulate to ovate or obovate, usually entire, surfaces

pubescent with branched or forked hairs or upper surface only of simple hairs; cauline leaves few, usually reduced, pubescent like basal ones, or upper surface with simple hairs; racemes (1-) several- to many-flowered, compact in fruit; pedicels 1-6 mm long, ascending, glabrous; sepals 1.5-2.5 mm long, greenish or yellowish, usually pubescent; petals 3-5 mm long, white, ovate, rounded, sometimes smaller or lacking in cleistogamous flowers; silicles 5-20 mm long, 1-2 mm wide, oblong, nearly erect, pubescent or glabrous; styles up to 0.15 mm long; seeds 15 or more.—Dry exposed sites from 1200 to 2000 m elevation in the northern two-thirds of Utah (but possibly cosmopolitan); throughout much of northern North America. Two more or less arbitrary varieties are present. *Draba reptans* is similar to, and not always distinct from, *D. cuneifolia* (q.v.).

1. Upper surface of the cauline leaves and one or both surfaces of the basal leaves pubescent with mostly simple hairs ..... *D. reptans* var. *reptans*
- Upper surface of all leaves predominantly pubescent with forked or branched hairs ..... *D. reptans* var. *stellifera*

**Var. *reptans*.** [*Arabis reptans* Lam.; *D. caroliniana* Walter; *D. micrantha* Nutt. ex Torr. & Gray; *D. coloradoensis* Rydb.; *D. reptans* var. *micrantha* (Nutt.) Fern.] Range of the species.

**Var. *stellifera*** (O. E. Schulz) C. L. Hitchc. [*D. caroliniana* f. *stellifera* O. E. Schulz; *D. caroliniana* ssp. *stellifera* (O. E. Schulz) Payson & St. John] Sympatric with the former.

*Draba sobolifera* Rydb. [*D. uncinialis* Rydb.; *D. sobolifera* var. *uncinialis* (Rydb.) O. E. Schulz] Perennial, caespitose, caudex branched, scapose, scapes 0.1-0.6 dm tall, pubescent with intermixed stellate, branched, and simple hairs; leaves 0.8-2 cm long, 0.2-0.5 cm wide, obovate to oblanceolate, pubescent with stalked stellate or 4-rayed hairs at least beneath, and usually ciliate with simple hairs at base; racemes (2-) 5-20-flowered, compact to elongating in fruit; pedicels 3-8 mm long, stellate or with branched hairs; sepals 1.8-2.5 mm long; petals 4-5 mm long, yellow, obovate; silicles 3-

8 mm long, 2.5-4 mm wide, ovate to elliptic, pubescent to glabrous; styles 0.4-1 mm long; seeds 4-12.—Sagebrush communities upwards to alpine tundra, from 2290 to 3660 m elevation in Tushar Mountains and on Markagaunt Plateau in Beaver, Garfield, and Piute counties; endemic.

The types of both *Draba sobolifera* and *D. uncinialis* were collected by Marcus E. Jones in the Delano Peak area west of Marysville, Piute County.

*Draba spectabilis* Greene. [*D. spectabilis* var. *glabrescens* O. E. Schulz] Perennial, not caespitose, caudex branched, stems mostly 1-4 dm tall, usually simple, pubescent with simple or forked hairs; basal leaves (0.5) 1-4 cm long, 0.2-1 cm wide, obovate to spatulate, subentire to denticulate, green, surfaces with subsessile 4-rayed or forked hairs, infrequently with the upper surface glabrous; cauline leaves mostly 3-15, ovate to lanceolate, subentire to sharply toothed, 0.5-2 cm long, 0.2-1.5 cm wide, pubescent like basal ones; racemes several- to many-flowered,

much elongating in fruit; pedicels 5-15 mm long or more, ascending, glabrous or hairy; sepals 2-3.5 mm long, yellowish, pubescent; petals 4.5-7 mm long, yellow but fading white, elliptic, rounded; silicles 5-14 mm long, 2-3 mm wide, lanceolate to ovate, plane, glabrous or pubescent; styles 0.8-2.5 mm long; seeds 10-20.—Opening in woods, at moderate to high elevations in La Sal and Abajo mountains of Grand and San Juan counties; Colorado, New Mexico, Arizona. Our material is var. *spectabilis*. The type of var. *glabrescens* was obtained in the La Sal Mountains.

*Draba stenoloba* Ledeb. [*D. nemorosa* var. *stenoloba* (Ledeb.) M. E. Jones; *D. nitida* Greene; *D. deflexa* Greene; *D. nitida* var. *nana* O. E. Schulz; *D. nitida* var. *praelonga* O. E. Schulz] Plants (annual?) biennial or short-lived perennial, from a taproot, caudex more or less developed, stems 0.3-2.5 dm tall, glabrous or sometimes hirsute below; basal leaves 0.3-4 cm long, 0.2-0.8 cm wide, entire to denticulate, pubescent with simple to forked or branched hairs, or with one or both surfaces glabrous on some leaves; cauline leaves (0) 1-8, ovate to lanceolate or elliptic, entire or denticulate, similar to the basal ones in all respects; racemes several- to many-flowered, elongating in fruit; pedicels 1-14 mm long, ascending, glabrous; sepals 1-2.2 mm long, greenish, glabrous; petals 2-4.5 mm long, yellow to cream or fading white, spatulate, rounded to emarginate; silicles 6-18 mm long, 1.5-2.2 mm wide, linear to oblong or elliptic, usually glabrous; styles up to 0.2 mm long; seeds 16 or more.—Woods, meadows, sagebrush communities and along stream banks from 2075 to 3350 m elevation in Beaver, Box Elder, Cache, Daggett, Duchesne, Emery, Garfield, Piute, Salt Lake, Sevier, Summit, Uintah, Utah, Wasatch, and Washington counties; Alaska and Yukon south to California, Nevada, Utah, and Colorado.

*Draba subalpina* Goodman & Hitchc. [*D. oriebata* of Utah references, not Macbride & Payson] Perennial, caespitose, caudex simple or branched, clothed with marcescent leaves, scapose, scapes 0.1-1.2 dm tall, rarely with one cauline leaf, glabrous

throughout or pubescent with simple or forked hairs at least near base; leaves 0.3-1.8 cm long, 0.1-0.4 cm wide, oblong to spatulate, surfaces glabrous or sparingly hirsute, ciliate with coarse simple or less commonly forked or branched hairs; racemes few- to many-flowered, only moderately elongating in fruit; pedicels (1) 2-10 mm long, usually purplish, glabrous; petals 4-5 mm long, white, cuneate-spatulate, emarginate; silicles 3-8 mm long, 2-4 mm wide, ovate to elliptic, plane or more or less contorted, glabrous; styles 0.6-1 mm long; seeds 6-12.—Spruce-fir, Douglas fir, or bristlecone pine woodlands mostly on the Pink Limestone member of the Wasatch Formation, from 2130 to 3050 m elevation in Garfield, Iron, and Kane counties; endemic.

The type is from Cedar Breaks, Iron County.

*Draba ventosa* A. Gray. Perennial, caespitose, the caudex usually branched, more or less clothed with marcescent leaves, scapose, scapes 0.2-0.4 dm tall, pubescent with simple and forked or sometimes stellate hairs; leaves 0.5-1.2 cm long, 0.2-0.4 cm wide, elliptic to lanceolate, surfaces pubescent with simple, forked, or branched to stellate hairs; racemes 3- to many-flowered, little elongating in fruit; pedicels mostly 4-8 mm long, ascending, densely pilose to stellate; sepals 2-2.5 mm long, greenish or yellowish, pilose; petals 4-5 mm long, yellow, obovate; silicles 5-8 mm long, 3.5-5.5 mm wide, oval to ovate, plane, densely hairy; styles 0.6-1.2 mm long; seeds 10-16.—Alpine tundra from 3050 to 3800 m elevation in the Uinta Mountains, in Summit (and perhaps elsewhere) County; Wyoming.

This species is poorly known and is seldom collected. Our description is tentative at best, being drawn on only limited material. The Utah plants are supposedly assignable to var. *ventosa*.

*Draba verna* L. Diminutive annual from a slender taproot, scapose, scapes 0.2-0.5 (1.2) dm tall, glabrous throughout or pubescent near base only; leaves 0.1-1 (2) cm long, 0.08-0.3 cm wide, spatulate to oblanceolate, entire or toothed, pubescent with branched hairs; racemes few- to many-flowered, elongating in fruit; pedicels 2-12 mm



long, ascending, glabrous; sepals 0.6-1.1 mm long, greenish or tinged purplish, glabrous or pubescent; petals 1.5-2.5 mm long, white, deeply bilobed; siliques 2-10 mm long, 1-4 mm wide, elliptic to obovate, glabrous; styles up to 0.2 mm long.—Dry open sites from 1375 to 1680 m elevation in Salt Lake and Weber counties; widespread in North America; Asia.

Our material is scanty and cannot be segregated into the two variants reported for North America.

ERYSIMUM L.

Plants pubescent with 2-3 (4)-rayed hairs, annual to perennial, from taproots; leaves alternate or basal and still alternate, simple,

entire to toothed, not auriculate; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, yellow to orange or burnt-orange to purple; stamens 6, filaments lacking glandular processes; style prominent, short to elongate, stigma bilobed; fruit a silique, many times longer than broad, compressed parallel to partition or subterete, valves 1- to several-nerved; seeds uniseriate, many per locule.

A genus of 100 species, mainly of Europe.

Rosbach, G. B. 1958. The genus *Erysimum* (Cruciferae) in North America north of Mexico—A key to species and varieties. Madroño 14:261-267.

- 1. Petals (10) 12-20 mm long or more; styles mostly 1.5-3 mm long; plants biennial or perennial; widespread in indigenous plant communities ..... *E. asperum*  
Petals 3.5-11 mm long; styles usually less than 1.5 mm long (longer in *E. repandum*); plants annual or biennial to short-lived perennial; restricted and weedy or less commonly in indigenous plant communities ..... 2
- 2(1). Petals 3.5-5 mm long; siliques 12-27 mm long; plants uncommon, annual weeds of moist sites ..... *E. chieranthoides*  
Petals mostly 5-11 mm long; siliques (15) 25-100 mm long; plants common, annual, biennial or perennial, of various habitats ..... 3
- 3(2). Pedicels usually more than 5 mm long, more slender than fruit; siliques ascending to erect, less than 50 mm long; plants indigenous biennial or short-lived perennial ..... *E. inconspicuum*  
Pedicels 2-5 mm long, almost or quite as thick as fruit; siliques spreading to curved-ascending, at least some often more than 50 mm long; plants adventive, annual weeds ..... *E. repandum*

*Erysimum asperum* (Nutt.) DC. Wallflower. Biennial or short-lived perennial, with simple or less commonly branched caudex, stems 1.2-8.5 (10) dm tall or more; basal leaves 2-10 (12) cm long, 0.2-1.4 cm wide, sublinear to elliptic or spatulate, entire or denticulate, grayish to green, pubescent with malpighian or Y-shaped appressed hairs; cauline leaves 1.1-10.4 cm long, 0.1-1.5 cm wide, much reduced to little if at all reduced upwards, variously shaped, entire or toothed, pubescent like basal ones; racemes much elongating in fruit; pedicels 3-17 mm long, spreading-ascending to ascending, usually more slender than the fruit; sepals

7.5-14 mm long, yellowish or purplish; petals 12-28 mm long, yellow to yellow-orange or burnt-orange; siliques (17) 20-115 mm long, 1-2.5 mm thick, subquadrangular to somewhat flattened, ascending to erect or less commonly spreading-ascending; styles 1-4 (5) mm long; seeds wingless or winged only near tip, 1.5-2.3 mm long.—Warm desert shrub, cool desert shrub, mountain brush, pinyon-juniper, ponderosa pine, aspen, spruce, fir, and Douglas fir to alpine tundra communities, throughout Utah; Yukon Territory south to California and Arizona, and eastward to Oklahoma, Kansas, and Minnesota.



1. Flowers yellow or yellowish; fruits erect or nearly so; common ..... *E. asperum* var. *purshii*  
 Flowers orangish to burnt-orange; fruits ascending to spreading-ascending;  
 common ..... *E. asperum* var. *amoenum*

**Var. *amoenum*** (Greene) Reveal. [*Cheiranthus nivalis* var. *amoenus* Greene; *Cheirinia amoena* (Greene) Rydb.; *E. wheeleri* Rothrock; *Cheirinia wheeleri* (Rothrock) Rydb.] Common throughout southern portions of state; California eastward to Colorado.

**Var. *purshii*** Durand. [*Cheiranthus capitatus* Dougl. ex Hook.; *E. elatum* Nutt. ex Torr. & Gray; *E. capitatum* (Dougl.) Greene; *Cheiranthus elatus* (Nutt.) Greene; *Cheiranthus asperimus* Greene; *Cheiranthus argillosus* Rydb.; *Cheiranthus bakeri* Greene; *Cheirinia elata* (Nutt.) Rydb.; *E. asperimum* (Greene) Rydb.; *E. oblanceolatum* Rydb.; *E. bakeri* (Greene) Rydb.; *E. aridum* A. Nels.; *E. capitatum* var. *argillosum* (Greene) R. J. Davis] Common throughout most of state, but particularly common in northern portion; Yukon Territory south to California and Arizona, east to Montana, Wyoming, Colorado, and New Mexico.

***Erysimum cheiranthoides*** L. [*Cheirinia cheiranthoides* (L.) Link; *Cheiranthus cheiranthoides* (L.) Heller] Annual, stems simple or branched, 2-12 dm tall; leaves 2-8 cm long, 0.2-1.5 cm wide, linear to oblong, lanceolate or oblanceolate, entire or denticulate, green, pubescent with malpighian or Y-shaped hairs; racemes much elongating in fruit; pedicels 4-15 mm long, spreading-ascending, very slender; sepals 2-3 mm long, yellowish or greenish; petals 3-5 mm long, pale yellow; siliques 12-27 mm long, about 1 mm wide, subterete, ascending to erect; styles 0.8-1 mm long; seeds 1-1.2 mm long, not winged.—Moist places, in meadows and along roadsides in Cache and Wasatch counties, and to be expected elsewhere; widespread in North America; adventive from Eurasia. This plant is evidently uncommon to rare in Utah.

***Erysimum inconspicuum*** (S. Wats.) Mac-Millan. [*E. asperum* var. *inconspicuum* S. Wats.; *E. parviflorum* Nutt. ex Torr. & Gray, not Pers.; *E. syrticum* Sheldon; *Cheiranthus inconspicuus* (S. Wats.) Greene;

*Cheirinia inconspicua* (S. Wats.) Rydb.; *Cheirinia syrticola* (Sheldon) Rydb.] Biennial or short-lived perennial with usually unbranched caudex, stems mostly 2-10 dm tall, usually simple; leaves 1.5-8 cm long, 0.2-0.8 cm wide, linear to oblong, elliptic, lanceolate or oblanceolate, pubescent with malpighian or Y-shaped hairs; racemes elongating in fruit; pedicels 3-8 mm long, ascending; sepals 4-7 mm long, greenish or purplish; petals (6) 7-10 (11) mm long, pale to bright yellow; siliques 15-50 mm long, 1-2 mm thick, quadrangular, erect or ascending; styles 1-1.5 mm long; seeds about 1.5 mm long, not winged.—Sagebrush and aspen-spruce communities at middle elevations in Garfield, Wasatch, and Washington counties, and to be expected elsewhere; Alaska and Yukon south to Oregon, Utah, and Colorado, and east to central Canada and the north-central states. This species resembles *E. asperum* in general habit, but is more restricted in its distribution in Utah.

***Erysimum repandum*** L. [*Cheirinia repanda* (L.) Link] Annual, stems 0.8-3 (5) dm tall, simple to much-branched; leaves 0.7-11 (15) cm long, 0.1-0.8 (1.2) cm wide, oblong, oblanceolate to linear, pubescent with malpighian and Y-shaped hairs; pedicels 2-5 mm long, spreading, almost or quite as thick as the fruit; sepals 3.5-5.8 mm long, yellowish or greenish; petals 5.2-8 mm long, yellow; siliques 26-85 mm long, 0.9-1.5 mm thick, quadrangular, spreading to ascending, rarely descending; styles 1-3 mm long; seeds ca 1 mm long, not winged.—Disturbed sites from 1300 to 1950 m elevation in Beaver, Grand, Juab, Millard, Salt Lake, Sanpete, Utah, and Washington counties, and to be expected elsewhere; widespread in North America; adventive from Europe.

**EUCLIDIUM** R. Br.  
 Nom. Cons.

Plants pubescent with forked hairs, annual, from taproots; leaves alternate, simple, entire to remotely serrulate, petiolate to

subsessile, not auriculate; flowers solitary and axillary or subaxillary, or borne in elongate racemes, pedicels sometimes subtended by bracts; sepals 4, caducous; petals 4, white, minute; stamens 6; style very short atop beak of fruit, stigma bilobed; fruit a silicle, bilocular, tardily dehiscent; seed 1 per locule.

A Eurasian genus of 2 species.

*Euclidium syriacum* (L.) R. Br. [*Anastatica syriaca* L.] Plants 0.4-5 dm tall, simple to much-branched, pubescent with forked hairs; leaves mainly cauline, 0.7-6.5 cm long, 0.2-1.7 cm wide, oblanceolate to elliptic or lanceolate, pubescent; pedicels 0.5-1 mm long, ascending to erect, pubescent; sepals 0.7-0.9 mm long, tinged with purple; petals 0.8-1.1 mm long, white, spatulate, erect; silicles (including beak) 2.8-4 mm long, body 1.2-2 mm wide, pubescent with simple or forked hairs, beak 1.2-1.6 mm long; style short or obsolete.—Roadsides, vacant lots, and dry foothills in Box Elder, Salt Lake, Summit, and Utah counties, and likely elsewhere; Idaho, Washington; adventive from Europe.

#### GLAUCOCARPUM Rollins

Plants glabrous and glaucous, perennial from a branching caudex; leaves alternate, simple, entire or sparingly dentate, not auriculate; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, yellow; stamens 6, paired ones united by filaments and anthers their entire length; style short, stigma capitate, entire, unpand; fruit a subsessile to sessile silique, many times longer than broad, slightly flattened, valves strongly 1-nerved; seeds uniseriate.

A monotypic genus endemic to Utah.

Rollins, R. C. 1938. *Glaucocarpum*, a new genus in the Cruciferae. *Madroño* 4:232-235.

*Glaucocarpum suffrutescens* (Rollins) Rollins. [*Thelypodium suffrutescens* Rollins in Graham] Plants perennial from a branching caudex forming small clumps, stems 1-2.5 dm tall, glabrous, lacking basal leaves; leaves (0.7) 1-2.5 cm long, 0.3-1 cm wide, elliptic to lanceolate or oblanceolate, short petiolate to subsessile, not auriculate; pe-

dicles (2.5) 3-12 mm long, curved-ascending to erect, glabrous; sepals 4-6 mm long, yellowish or greenish; petals 9-11 mm long, yellow, spatulate, ascending to spreading; silicles 10-20 mm long, 1.2-3 mm wide, flattened, erect, glabrous; styles (0.5) 1-2 mm long, stigma capitate, entire; seeds 4-8 per locule.—Local and infrequent on calcareous shale of the Green River Formation, west of Willow Creek in the vicinity of Big Pack Mountain, from 1645 to 1825 m elevation, Uintah County; endemic.

This genus is the only one strictly endemic to the state.

#### HALIMOLOBOS Tausch

Plants pubescent with simple, forked, and branched hairs, (annual) biennial or perennial, arising from a taproot; leaves alternate or basal and still alternate, simple, dentate to subentire, tapering to base or cauline sessile and auriculate; flowers racemose, pedicels ascending, not subtended by bracts; sepals 4; petals 4, white; stamens 6; styles prominent, stigma small, entire; fruit a sessile, slender silique, many times longer than broad, terete to quadrangular, valves strongly 1-nerved; seeds biseriate, numerous.

A genus of perhaps 15 species of North and South America.

Rollins, R. C. 1943. Generic revisions in the Cruciferae: *Halimolobos*. *Contr. Dudley Herb.* 2: 241-265.

Rollins, R. C. 1952. A note on *Halimolobos*. *Rhodora* 54:161-163.

*Halimolobos virgata* (Nutt.) O. E. Schulz. [*Sisymbrium virgatum* Nutt. ex Torr. & Gray; *Hesperis virgata* (Nutt.) Kuntz; *Stenophragma virgatum* (Nutt.) Greene; *Arabis brebneriana* A. Nels.; *Pilosella virgata* (Nutt.) Rydb.; *P. stenocarpa* Rydb.; *Arabidopsis virgata* (Nutt.) Rydb.; *Arabidopsis stenocarpa* (Rydb.) Rydb.] Biennial but occasionally flowering the first year, stems 1-3.5 dm tall, simple or branched, pubescent with mixed simple, forked, and branched hairs at least below; basal leaves 3-6 cm long, 0.5-1.8 cm wide, oblanceolate to lanceolate, denticulate to dentate, rarely entire; cauline leaves several, reduced upwardly, at least uppermost both sessile and auriculate; pedicels 7-11 mm long, ascending, glabrous or

puberulent; sepals 2.5-3 mm long, greenish, pubescent; petals 4-4.5 mm long, white, veins often suffused with pink or purple, usually erect; siliques 15-40 mm long, mostly 1-1.5 mm wide, subquadrangular, erect, valves glabrous, strongly nerved; styles 0.2-0.5 mm long; seeds irregularly biserrate.—Grassy meadows and shrublands along the north slope of the Uinta Mountains in Daggett (US) and Summit counties; Colorado, Wyoming, Idaho, and northward to Alberta and Saskatchewan.

The number of generic segregates listed above are an indication of the difficulties involved in placing this unusual species in a genus. It simulates an *Arabis*, from which it is outwardly separable only with difficulty, but on technical grounds is probably more closely allied to *Sisymbrium* in a broad sense. Our Utah material, and that from southwestern Wyoming, differs slightly from that found elsewhere and may deserve varietal recognition.

#### HESPERIS L.

Plants pubescent with simple and forked hairs, perennial, from taproots; leaves alternate, simple, sinuate-dentate or serrate, mainly cauline, petiolate to subsessile, not auriculate; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, pink to lavender or white; stamens 6, filaments lacking glandular processes; styles obsolete, stigma bilobed, massive; fruit a silique, many times longer than broad, subterete, tardily dehiscent, valves 1 (3)-nerved; seeds uniseriate.

A Eurasian genus of perhaps 24 species, many cultivated.

*Hesperis matronalis* L. Dame's Violet; Sweet Rocket. Plants perennial with one to several stems, these simple or branched, mostly 5-12 dm tall or more, pubescent with mixed forked and simple hairs; leaves 2-15 (20) cm long, 0.6-3.5 (4) cm wide, ovate-lanceolate to elliptic or lanceolate, sinuate-dentate to serrate, pubescent; pedicels 8-21 mm long, ascending to spreading, pubescent; sepals 6.5-8 mm long, often suffused with red or purple, pubescent; petals 15-25 mm long, pink to lavender or white, obovate, spreading; siliques 31-100 mm long, 1-

2 mm wide, subterete, erect or ascending, puberulent; styles obsolete, stigma deeply bilobed; seeds numerous in each locule.—Cultivated ornamental, persisting and escaping, now widely established in cultivated lands especially along irrigation canals at mid elevations in Cache, Utah, and Summit counties, and expected to be established elsewhere; introduced from Europe.

#### HUTCHINSIA R. Br.

Plants glabrous, annual or winter annual, from taproots; leaves alternate, simple, entire to pinnatifid, petiolate to sessile, not auriculate; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, white; stamens 6, filaments lacking glandular processes; styles obsolete or very short, stigma capitate, entire; fruit a silicle, only somewhat longer than broad, strongly compressed at right angles to septum, valves reticulately veined; seeds several.

A genus of 6 Eurasian and 1 North American species.

*Hutchinsia procumbens* (L.) Desv. [*Lepidium procumbens* L.; *Hymenolobus divaricatus* Nutt. ex Torr. & Gray; *Hymenolobus erectus* Nutt. ex Torr. & Gray] Slender, diminutive annuals, stems glabrous, simple or more commonly branched, 0.5-3 dm long, erect or prostrate; leaves basal and cauline, 0.5-3 cm long, 0.1-1.3 cm wide, ovate to lanceolate, oblanceolate, or nearly linear, entire to pinnatifid, petiolate to subsessile; pedicels 3-8 mm long, ascending to spreading-ascending, glabrous; sepals 0.7-1.1 mm long, greenish or purplish, glabrous; petals 0.8-1.3 mm long, white, spatulate, rounded to retuse; silicles 2.4-4.2 mm long, 1.5-2 mm wide, elliptic to obovate, truncate, rounded, or somewhat emarginate, glabrous; styles up to 0.2 mm long; seeds several per locule.—Moist to dry sites, hanging gardens, drainage banks, sidewalks, roadsides, playas, and peat bogs from 850 to 1830 m elevation in Garfield, Salt Lake, San Juan, Utah, and Washington counties; widely distributed in North America; Eurasia.

#### ISATIS L.

Plants pubescent with long simple hairs at least below, biennial or short-lived per-

ennial, from strong taproots; leaves simple, alternate, basal petiolate, cauline hastately-auriculate; flowers racemose or paniculate, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, yellow; stamens 6, filaments lacking glandular processes; styles obsolete, bilobed stigma sessile; fruit a silicle, samaroid, indehiscent, flattened at right angles to the plane of the partition (which is lacking), more or less reticulate; seeds solitary.

A genus of about 30 Eurasian species, many in cultivation.

*Isatis tinctoria* L. Dyer's Woad. Plants erect, stems 3.5-10 dm tall or more, glabrous throughout or hirsute with long simple hairs at base; basal leaves 3.5-15 (18) cm long, 0.8-4 cm wide, oblanceolate to elliptic, subentire to crenulate, ciliate to pilose with simple hairs; cauline leaves gradually reduced upwards, lanceolate to elliptic, entire, hastately-auriculate, glabrous or pilose on veins beneath and often ciliate; pedicels 4.5-9 mm long, reflexed, glabrous; sepals 1.8-2.3 mm long, yellowish, glabrous; petals 3-4.2 mm long, yellow, spatulate, rounded; silicles mostly 10-18 mm long, 4-7 mm wide, cuneate-oblong to oblanceolate, more or less truncate-rounded apically, glabrous; stigmas sessile.—Roadsides, abandoned fields, and dry foothills from 1350 to 1980 m elevation in Box Elder, Cache, Davis, Sanpete, Summit, Utah, and Weber

counties; widely established in the United States; adventive from Europe.

This plant is the source of a blue dye and was thus widely cultivated in the recent past. It seems to be spreading outwardly from its initial foci in Box Elder County, where it has been established as a weed since at least 1947.

LEPIDIDIUM L.

Plants glabrous or with simple hairs, annual, biennial or perennial, from taproots; leaves alternate or basal and still alternate, simple and entire or variously toothed or bi- or tripinnatifid, petiolate or sessile, auriculate in some; flowers racemose, pedicels lacking bracts; sepals 4, caducous or persistent; petals 4, yellow or white, infrequently lacking; stamens 6, rarely 2 or 4, filaments lacking glandular processes; style obsolete or well developed, stigma capitate; fruit a silicle, usually less than twice longer than broad, compressed at right angles to septum, dehiscent, valves more or less reticulately veined; seeds 1 per locule. (Note: Measurement of silicle length includes style.)

A complex genus of perhaps 150 species found throughout the world, many as weeds.

Hitchcock, C. L. 1936. The genus *Lepidium* in the United States. *Madroño* 3:265-320.  
Mulligan, G. A. 1961. The genus *Lepidium* in Canada. *Madroño* 16:77-90.

- 1. Cauline leaves perfoliate-clasping or auriculate ..... 2
- Cauline leaves petiolate to sessile but not auriculate or clasping ..... 3
- 2(1). Petals 2-2.5 mm long, white; cauline leaves lanceolate to lance-oblong, merely auriculate ..... *L. campestre*
- Petals 1-2 mm long, yellow; cauline leaves oval to ovate, pseudoperfoliate .... *L. perfoliatum*
- 3(1). Plants arising from thickened, well-developed caudices; leaves all entire; stems seldom more than 2.5 dm tall; plants rare, south-central to northern Utah ..... 4
- Plants from simple or branched caudices, these seldom thickened; leaves entire, toothed or pinnatifid; stems short to long; plants widespread ..... 5
- 4(3). Leaves linear; petals more than 3 mm long; plants of xeric shales, known only from Duchesne County ..... *L. barnebyanum*
- Leaves oblanceolate to elliptic; petals less than 3 mm long; plants of moist meadows from Beaver County northward but not of Duchesne County .....



		<i>L. integrifolium</i>
5(3).	Styles 0.3-1 mm long; plants perennial or biennial .....	6
	Styles obsolete or only up to 0.3 mm long; plants annual, rarely if ever biennial .....	7
6(5).	Stems woody well above base; petals mostly 3 mm long or more; silicles 4.5-7.5 mm long, obovate; plants of Washington County .....	<i>L. fremontii</i>
	Stems slightly if at all woody above base; petals mostly less than 3 mm long (but sometimes longer); silicles 2-4 mm long, ovate; plants almost cosmopolitan in Utah .....	<i>L. montanum</i>
7(5).	Sepals persistent, enclosing mature silicle; silicles plainly reticulate; pedicels narrowly wing-margined; plants evidently rare .....	<i>L. strictum</i>
	Sepals deciduous at or shortly following anthesis; silicles plainly to slightly reticulate; pedicels terete to strongly flattened; plants at least locally common .....	8
8(7).	Fruits emarginate and with prominent, acute, and divergent toothlike apices .....	<i>L. dictyotum</i>
	Fruits emarginate but lobes on each side of sinus neither acute nor divergent .....	9
9(8).	Pedicels much flattened, about twice broader than thick .....	10
	Pedicels not strongly flattened, not twice as broad as thick .....	11
10(9).	Plants short-hirsute to hispid hairy; silicles pubescent .....	<i>L. lasiocarpum</i>
	Plants softly hairy; silicles glabrous or pubescent .....	<i>L. densiflorum</i>
11(9).	Petals lacking, or, if present, generally shorter than sepals; silicles oblong-obovate to obovate .....	<i>L. densiflorum</i>
	Petals present and usually surpassing sepals; silicles elliptic-rotund to orbicular .....	<i>L. virginicum</i>

*Lepidium barnebyanum* Reveal. [*L. montanum* ssp. *demissum* C. L. Hitchc., not *L. demissum* C. L. Hitchc.] Perennial, densely pulvinate-cespitose, from a thickened branched caudex, clothed with marcescent leaf bases; stems erect, 0.7-1.2 dm tall, subglabrous or minutely recurved scaberulous, simple or branched from the upper axils; basal leaves 1-4 cm long, 0.1-0.2 (0.3) cm wide, somewhat flattened and minutely wing-margined, scaberulous; sepals 2-2.3 mm long, greenish, glabrous or puberulent; petals 3.5-4.2 mm long, white, obovate, spreading; stamens 6; silicles 3-6.2 mm long, 3-4 mm wide, lanceolate to elliptic, glabrous, plane, wingless; styles 0.5-1.2 mm long.—White (Green River) shale outcrops, Indian Canyon, Duchesne County; known only from the type locality; endemic.

*Lepidium campestre* (L.) R. Br. [*Thlaspi campestre* L.] Annual, lacking a caudex,

stems 1.5-6 dm tall, hirtellous throughout with simple hairs; basal leaves 3-12 cm long, 0.8-1.5 cm wide, oblanceolate, entire or variously lobed; cauline leaves numerous, reduced upwards, becoming sessile and auriculate, usually denticulate; pedicels mostly 4-7 mm long, spreading, slightly flattened, hirtellous; sepals 1.3-2 mm long, greenish or variously tinged, hirtellous; petals 1.7-2.5 mm long, white, spatulate, ascending; stamens 6; silicles 5-6 mm long, oblong-ovate, glabrous or puberulent, concave, wingless, slightly emarginate; styles 0.2-0.6 mm long.—Roadsides and disturbed sites from 1300 to 2000 m elevation in Salt Lake, Summit, and Utah counties, and probably widespread in the state; widely established in North America; Asia.

*Lepidium densiflorum* Schrad. Annual, lacking a caudex, stems 0.3-5 dm tall or more, densely finely hairy to puberulent



throughout; basal leaves 1.2-11 cm long, 0.3-2.2 cm wide, oblanceolate, entire and more commonly pinnately lobed; cauline leaves several to many, reduced upwards, petiolate to sessile, not auriculate, lobed, toothed or entire; pedicels 1.5-3 mm long, spreading to ascending, subterete to conspicuously flattened, glabrous to puberulent; sepals 0.6-1.1 mm long, often purplish, glabrous; petals 0.7-1 mm long, white, nar-

rowly oblong, sometimes lacking; stamens 2; silicles 2.5-3.5 mm long and about as wide, elliptic to oval or obovoid, glabrous or rarely pubescent, shallowly notched apically, teeth rounded; style lacking.—Widespread from low to moderate elevations in Utah; North America; Eurasia. Our material is separable into three more or less distinctive variants.

1. Silicles pubescent, the pedicels usually somewhat flattened, especially on lower side; plants evidently rare ..... *L. densiflorum* var. *pubicarpum*  
 Silicles glabrous, pedicels definitely flattened or else subterete; plants common ..... 2
- 2(1). Pedicels subterete, silicles averaging less than 3 mm long; plants commonly of waste places ..... *L. densiflorum* var. *densiflorum*  
 Pedicels definitely flattened, especially on upper side, silicles averaging at least 3 mm long; plants often growing in indigenous communities .....  
 ..... *L. densiflorum* var. *ramosum*

**Var. *densiflorum*** [*L. neglectum* Thell.; *L. bourgeauanum* Thell.; *L. densiflorum* var. *bourgeauanum* (Thell.) C. L. Hitchc.] Weedy species usually of waste places, less commonly of indigenous plant communities, of Duchesne, Grand, Iron, Kane, Millard, Piute, Sevier, Uintah, Utah, and Washington counties, possibly cosmopolitan; range of species.

This variety is abundant in Utah; we have not been able to distinguish the var. *bourgeauanum* from among this material.

**Var. *pubicarpum*** (A. Nels.) Thell. [*L. pubicarpum* A. Nels.] Uncommon in dry sites in Salt Lake and Sanpete counties, and undoubtedly elsewhere; Washington to Montana and south to California.

**Var. *ramosum*** (A. Nels.) Thell. [*L. ramosum* A. Nels.; *L. densiflorum* var. *pubicaule* Thell.] Common, usually in indigenous communities, in Emery, Garfield, Grand, Kane, San Juan, Sanpete, Uintah, and Utah counties, and probably elsewhere; Wyoming south to New Mexico west to California.

***Lepidium dictyotum*** A. Gray. [*L. dictyotum* var. *macrocarpum* Thell.] Annual, lacking a caudex, stems 0.2-1.5 dm tall, pubescent; basal leaves usually pinnatifid with 2-5 pairs of linear lobes; cauline leaves mostly entire, reduced upwards; pedicels

1.5-3.5 mm long, flattened, spreading to reflexed; sepals 0.7-1 mm long, greenish, pubescent; petals 1-1.2 mm long, white, oblong, or usually lacking; stamens typically 4; silicles 3.2-4.5 mm long, 2-2.5 mm wide, ovate, glabrous or hirtellous, notched apically, teeth prolonged and usually divergent, acute; style lacking.—Evidently rare in Utah, reported from Salt Lake County by Hitchcock (1936, cited above).

***Lepidium fremontii*** S. Wats. Perennial subshrubs, definitely woody above base, stems mostly 3-8 dm tall, glabrous and glaucous; leaves cauline, mostly 1.5-5 (8) cm long, pinnatifid into linear-oblong, acute lobes up to 2 mm wide, becoming simple above, not auriculate; bracts subtending to curved-ascending, glabrous; sepals 1.6-2.1 mm long, green, glabrous; petals 3-4.5 mm long, white, obovate; stamens typically 6; silicles 4.5-7.5 mm long, 5.2-6.5 mm wide, obovate, glabrous, slightly notched apically; styles 0.4-1.3 mm long.—Blackbrush, creosote brush, and other warm desert shrub communities from 600 to 1525 m elevations in Washington County; Arizona, Nevada, and California.

This species is obviously related to *L. montanum* (q.v.), but differs in being woody, having distinctive bracts in the in-

florescence, and in having larger, obovate silicles.

*Lepidium integrifolium* Nutt. [*L. utahense* M. E. Jones; *L. zionis* A. Nels.; *L. montanum* var. *integrifolium* (Nutt.) C. L. Hitchc.] Perennial, caespitose, from a thickened, usually branched caudex, more or less clothed with marcescent leaf bases, stems decumbent-ascending, 1.5-2.5 dm tall, minutely puberulent, simple or branched from upper axils; basal leaves 3-8.5 cm long, 0.6-2.5 cm wide, elliptic to oblanceolate, entire; cauline leaves mostly 1-4 cm long, 0.2-1.2 cm wide, gradually reduced upwards, glabrous or nearly so; pedicels 5-8.5 mm long, spreading to ascending, puberulent; sepals 1.5-2 mm long, greenish, glabrous or pubescent; petals 2.7-3.1 mm long, white, obovate; stamens typically 6; silicles 3-4.2 mm long, 1.7-2.7 mm wide, ovate to lanceolate, glabrous, plane, wingless; styles 0.4-0.7 mm long.—Saline meadows at low to moderate elevations in Beaver, Rich, Sevier, and Uintah counties; Wyoming.

This distinctive entity has been collected only rarely possibly because the habitat type has been exploited as marginal pastureland in Utah and Wyoming.

1. Pedicels glabrous or merely puberulent on lower side; stems, at most, hispidulous ..... *L. lasiocarpum* var. *georginum*
- Pedicels hispidulous on lower side; stems definitely hispid .....  
..... *L. lasiocarpum* var. *lasiocarpum*

**Var. *georginum*** (Rydb.) C. L. Hitchc. [*L. georginum* Rydb.; *L. lasiocarpum* ssp. *georginum* (Rydb.) Thell.] Warm desert shrublands and lower pinyon-juniper woodlands in Grand, Kane, San Juan, Tooele, Uintah, and Washington counties; Arizona westward to California.

**Var. *lasiocarpum*** [*L. palmeri* S. Wats.; *L. lasiophyllum* Brandegee; *L. lasiocarpum* ssp. *palmeri* (S. Wats.) Thell.; *L. lasiocarpum* ssp. *lasiophyllum* (Brandegee) Thell.] Warm to cool desert shrublands in Kane, Millard, Utah, and Washington counties; Arizona westward to California.

*Lepidium montanum* Nutt. Perennial or less commonly biennial herbs or rarely suffrutescent, seldom definitely woody above base, stems 0.3-12 dm tall or more, glabrous

*Lepidium lasiocarpum* Nutt. ex Torr. & Gray. Annual, lacking a caudex, stems 0.2-3 dm tall or more, hispidulous to distinctly hispid with simple hairs; basal leaves mostly 1-8.5 cm long, 0.3-0.9 cm wide, oblanceolate, pinnatifid or merely lobed or toothed; cauline leaves few to several, reduced upwards, petiolate to sessile, not auriculate; pedicels 1.5-5 mm long, spreading to ascending, conspicuously flattened, usually puberulent to hispidulous; sepals 1-1.2 mm long, greenish or reddish to purplish, glabrous; petals 1-1.3 mm long, white, narrowly oblong, sometimes lacking; stamens 2 or 4; silicles 3.4-4.5 mm long, 2.7-4 mm wide, elliptic to rotund or obovate, hispidulous, notched apically, teeth sometimes elongate-winged, rounded; style lacking or nearly so.—Widely distributed mostly in the southern two-thirds of Utah; California eastward into New Mexico and Texas.

Plants with somewhat attenuate apical teeth on the silicles approach *L. dictyotum*, and possibly they account for reports of that entity from Utah.

Two scarcely distinguishable varieties are known from Utah:

or variously puberulent to hirtellous; leaves basal or basal and cauline, 0.5-12.5 cm long, 0.1-2.5 cm wide, variously shaped, entire to pinnatifid, often at least uppermost cauline ones simple; bracts subtending branches of inflorescence seldom more than 1 cm long; pedicels 3-8 mm long, spreading to ascending, glabrous or puberulent; sepals 1.2-1.7 mm long, green or variously tinged, glabrous or puberulent; petals 2.5-3.5 mm long, white, obovate to spatulate; stamens typically 6; silicles 2.8-4.1 mm long, 2.1-2.5 mm wide, ovate to elliptic, glabrous or rarely puberulent; styles 0.3-0.9 mm long.—Low to high elevations throughout Utah; Oregon to Wyoming southward to California, Arizona, New Mexico, and Texas.

There is an amazing amount of variation

within *L. montanum* as interpreted herein. The more stable phases have been treated previously either as species or as varieties. There is some justification for recognizing

all of these entities at the specific level, but the convenience of having an inclusive species with several variants seems to best represent the situation within Utah.

1. Plants mostly 6-12 dm tall; cauline leaves simple, toothed or entire, often more than 4 mm wide; flowering from midsummer to autumn; eastern to southeastern Utah ..... *L. montanum* var. *spathulatum*  
Plants usually less than 6 dm tall; cauline leaves various, if simple and entire then usually less than 4 mm wide; flowering in springtime and midsummer (at higher elevations); distribution various ..... 2
- 2(1). Basal leaves well developed, usually over 5 cm long and 0.6 cm wide; cauline leaves few, reduced upwards; plants usually montane ..... 3  
Basal leaves poorly, if at all, developed, usually less than 5 cm long and 0.6 cm wide; cauline leaves numerous to few, gradually reduced upwards; plants seldom montane ..... 4
- 3(2). Stems puberulent almost or quite throughout ..... *L. montanum* var. *alpinum*  
Stems glabrous almost or quite throughout ..... *L. montanum* var. *heterophyllum*
- 4(2). Stems glabrous or essentially so (rarely puberulent); plants somewhat woody at the base ..... 5  
Stems puberulent almost or quite throughout; plants herbaceous or somewhat woody at the base ..... 6
- 5(4). Plants (0.7) 1-6 (10) dm high; basal leaves divided, not entire; widespread in eastern, southeastern and southern Utah ..... *L. montanum* var. *jonesii*  
Plants 0.2-0.5 (0.7) dm high; basal leaves entire or some divided; rare and local, Aquarius Plateau, Garfield County ..... *L. montanum* var. *neeseae*
- 6(4). Plants perennial, the caudex woody; silicles puberulent; stems 0.5-1 dm tall; restricted to Kane County ..... *L. montanum* var. *stellae*  
Plants biennial or perennial, the caudex lacking or only slightly woody; silicles glabrous; stems often over 1 dm tall; widespread in western Utah .....  
..... *L. montanum* var. *montanum*

*Var. alpinum* S. Wats. [*L. scopulorum* M. E. Jones; *L. heterophyllum* M. E. Jones] Plants of rocky or sandy places at moderate to high elevations in Box Elder and Salt Lake counties; endemic.

*Var. heterophyllum* (S. Wats.) C. L. Hitchc. [*L. integrifolium* var. *heterophyllum* S. Wats.] Oak brush community, Cedar Canyon, Iron County. Endemic.

*Var. jonesii* (Rydb.) C. L. Hitchc. [*L. jonesii* Rydb.; *L. crandallii* Rydb.; *L. tortum* L. O. Williams; *L. alyssioides* var. *jonesii* (Rydb.) Thell.; *L. alyssioides* var. *stenocarpum* Thell.] This is the abundant spring-flowering form of *L. montanum* of the Colorado drainage system. Mostly of middle to low elevations in Carbon, Duchesne, Emery,

Garfield, Grand, Kane, San Juan, Uintah, Utah, Washington, and Wayne counties; Arizona and Nevada eastward to Colorado.

*Var. montanum*. [*L. corymbosum* Hook. & Arn.; *L. utaviense* Regal; *L. brachybotryum* Rydb.; *L. philonitrum* Nels. & Macbr.; *L. albiflorum* Nels. & Macbr.; *L. montanum* var. *stenocarpum* Thell.; *L. scopulorum* f. *nanum* Thell.; *L. montanum* var. *canescens* (Thell.) C. L. Hitchc.] The phase distinguished as var. *canescens* by Hitchcock passes into var. *montanum* through a series of morphological intermediates; thus it is placed here in synonymy with var. *montanum*. The var. *montanum* is a plant of lower elevations in Box Elder, Duchesne, Iron, Juab, Millard, Piute, Sevier, Summit,

Tooele, Utah, and Washington counties; Idaho and Wyoming south to Arizona, Nevada, and California.

**Var. *neeseae*** Welsh & Reveal, var. nov. *Plantula similis Lepidio montano* var. *stellae* sed differt in caudicibus non ligneis, foliis basalibus et integris vel lobatis, et siliculis glabris. Holotype: Utah, Garfield Co., T.32S., R.3E., sec. 35, 14 mi due north of Escalante at Hell's Backbone, 2745 m, Neese & White 3332, 23 June 1977 (BRY, Isotypes to be distributed). Paratype: Garfield Co., T.33S., R.3E., sec 35, 1 mile due southeast of Hell's Backbone, 2745 m, Neese & White 3944, 3 Aug. 1977 (BRY). The variety is named to honor Elizabeth Neese, ardent collector and student of the Henry Mountains flora.

**Var. *spathulatum*** (B. L. Robinson) C. L. Hitchc. [*L. scopulorum* var. *spathulatum* B. L. Robinson. *L. spathulatum* Vasey ex Robinson, not Philippi; *Thelypodium crenatum* Greene; *L. crenatum* (Greene) Rydb.; *L. caseyanum* Thell.; *L. montanum* var. *eastwoodiae* sensu Utah material; *L. montanum* var. *alyssoioides* sensu Utah material] This is the tall phase of the species which flowers in midsummer and autumn in southeastern Utah, in Garfield, Grand, Kane, San Juan, and Uintah counties; Colorado.

This variant is sufficiently distinct from the body of the remaining varieties of *L. montanum* to be recognized at the specific level. If that is done, the correct name at the specific level would be *L. crenatum*.

**Var. *stellae*** Welsh & Reveal, var. nov. *Plantula similis Lepedio montano* var. *montano* sed differt in siliculis puberulentis et caudicibus bene evolutis. Type: Kane County, Utah, along Cottonwood Wash Road, 6.4 miles south of Cannonville, on reddish clay soil near white barren shale outcrops south of the road, associated with *Artemisia*, *Juniperus*, and *Lesquerella tumulosa* at about 1700 m elevation, 29 May 1976, Reveal & Reveal 4454. Holotypus, BRY. Isotypi, 15 to be distributed from US. Paratype: Welsh & Welsh 12841 (BRY).

The variety is named to honor Stella L. T. Welsh, the cocollector, with the senior author, of this plant in June of 1975.

***Lepidium perfoliatum*** L. Peppergrass.

Plants annual, lacking a caudex, stems 0.7-4 (6) dm tall, hirtellous below, glabrous and glaucous above; basal leaves 0.8-15 cm long, 0.2-2.8 cm wide, bi- or tripinnatifid into narrow segments; cauline leaves with lowermost like basal ones, these transitional upwardly into entire and falsely perfoliate-clasping ones; pedicels 3-6.5 mm long, spreading-ascending, glabrous, subterete; sepals 0.7-1.2 mm long, often purplish, glabrous or pubescent; petals 0.8-1.5 mm long, yellow, narrowly spatulate, ascending; stamens usually 6; silicles 3.5-4.3 mm long, 3.2-3.6 mm wide, oval to elliptic, glabrous, plane, wingless or essentially so, slightly emarginate; style 0.1-0.3 mm long.—Disturbed sites and dry slopes, flats, and other places at low elevations in Box Elder, Cache, Iron, Juab, Kane, Salt Lake, San Juan, Sanpete, Tooele, Utah, Washington, and Weber counties, and probably cosmopolitan; widespread in the United States; adventive from Europe.

***Lepidium strictum*** (S. Wats.) Rattan. [*L. oxycarpum* var. *strictum* S. Wats.; *L. reticulatum* Howell; *L. pubescens* of authors, not Desv.] Annual, lacking a caudex, stems 0.5-2 dm long, prostrate to rarely erect, pubescent; basal leaves mostly 3-7 cm long, 1-2 cm wide, bipinnatifid; cauline leaves less divided, uppermost sometimes entire; pedicels mostly 2-3 mm long, ascending, flattened, and narrowly wing-margined; sepals 1-1.5 mm long, persistent, purplish, pubescent; petals minute or lacking; stamens 2; silicles 2.2-3.5 mm long, 2-3 mm broad, oval to oblong-ovate, planely reticulate, slightly winged, concave, notched apically; style lacking.—Apparently rare in Utah and possibly not a part of the continuing flora; cited by Hitchcock (1936) from Castle Gate, Carbon County, collected by Grant in 1900.

***Lepidium virginicum*** L. Plants annual, lacking a caudex, stems 1.5-7 dm tall, pubescent throughout or glabrous above; basal leaves 1.3-15 cm long, 0.3-3.5 (5) cm wide, coarsely toothed to lobed; cauline leaves reduced upwards, uppermost usually entire; pedicels 2-6 mm long, spreading, terete or nearly so, pubescent or glabrous; sepals 0.6-1 mm long; petals 0.7-1.5 (3) mm long, white, spatulate, rarely lacking; silicles 2.5-4

mm long, 2.2-3.5 mm broad, elliptic to orbicular, usually glabrous, plane, notched apically; style lacking.—Roadside, trails, foothills, stream sides, and similar disturbed places from low to moderate elevations in Salt Lake, Utah, Wasatch, Washington, and Weber counties, and likely elsewhere; widely distributed in North America.

Our material belongs to var. *pubescens*

(Greene) Thell. [*L. intermedium* var. *pubescens* Greene; *L. hirsutum* Rydb.], the combination made by Thellung annotating that by Hitchcock by thirty years, and thus making the change of authorship necessary here. Because it seems probable that other varieties will be found in the state, the following key is provided:

- 1. Silicles usually consistently longer than broad; stems usually hirtellous throughout; plants of eastern United States, adventive in our region ..... *L. virginicum* var. *virginicum*  
Silicles usually about as long as broad; stems glabrous above or minutely puberulent throughout; plants indigenous ..... 2
- 2(1). Pedicels and raceme-rachis minutely puberulent ..... *L. virginicum* var. *pubescens*  
Pedicels and raceme-rachis glabrous ..... *L. virginicum* var. *medium*

**Var. medium** (Greene) C. L. Hitchc. [*L. intermedium* A. Gray, not Richard; *L. medium* Greene; *L. glaucum* Greene; *L. idahoense* Heller] Reported from all states surrounding Utah on north and east, and to be expected here.

**Var. pubescens** (Greene) Thell. Distribution as given above.

**Var. virginicum.** Reported from scattered sites in the West and to be expected in Utah.

LESQUERELLA S. Wats.

Plants stellate pubescent annual (biennial) or perennial, arising from taproots; leaves basal and cauline, alternate, simple, tapering to base or merely sessile, nto auriculate; flowers racemose, pedicels straight, sigmoid, reflexed, spreading or ascending, not subtended by bracts; sepals 4, deciduous; petals

4, yellow, rounded; stamens 6, filaments lacking glandular processes; style slender, stigma capitate; fruit a sessile to substipitate silicle, less than twice longer than broad, varying in outline, compressed parallel or contrary to septum, valves veinless; seeds 2-10 per locule, biseriate.

A genus of about 80 species found in North and South America and just entering Asia.

Maguire, B., and A. H. Holmgren. 1951. Botany of the intermountain region—II. *Lesquerella*. Madroño 11:172-184.  
Payson, E. B. 1921. A monograph of the genus *Lesquerella*. Ann. Missouri Bot. Gard. 8:1-3-236.  
Rollins, R. C., and E. A. Shaw. 1973. The genus *Lesquerella* in North America. Cambridge, Mass.: Harvard University Press. 288 p.

- 1. Lowermost leaves narrow, mostly 1-5 mm wide, blade and petiole indistinct, or, if so, as in *L. rectipes*, plants tall and of low elevations, tufted at stem base; basal and cauline leaves alike in general shape ..... KEY I  
Lowermost leaves often over 5 mm wide, blade distinct from petiole, forming a rosette; basal leaves clearly of a different shape from cauline leaves ..... KEY II

Key I.

Basal and cauline leaves alike

- 1. Silicles and ovaries glabrous ..... 2  
Silicles and ovaries stellate pubescent ..... 4
- 2(1). Stems mostly 0.6-1.8 dm tall; silicle bodies 4 mm long or more; plants of San Juan County ..... *L. fendleri*



Stems 0.1-0.5 dm tall; silicle bodies usually less than 4 mm long; plants of south-central Utah .....	3
3(2). Plants densely pulvinate-cespitose, cushionlike, with usually numerous caudex branches; restricted to white shale outcrops southeast of Cannonville, Kane County .....	<i>L. tumulosa</i>
Plants caespitose in small compact to loose clumps, with one to several caudex branches; restricted to limestones on Paunsagaunt Plateau .....	<i>L. rubricundula</i>
4(1). Plants definitely pulvinate-cespitose, usually less than 1 dm tall; styles mostly 1-2 mm long; known from Washington and Kane counties .....	<i>L. arizonica</i>
Plants various, but if pulvinate-cespitose and less than 1 dm tall, then styles usually 2-4 mm long or more, or distribution otherwise .....	5
5(4). Plants usually less than 1 dm tall; basal leaves linear to narrowly spatulate; usually of middle to high elevations .....	6
Plants usually 1.5-2 dm tall or more; basal leaves spatulate to oblanceolate; usually of middle to lower elevations .....	7
6(5). Pedicels usually strongly S-shaped; inner basal leaves usually flat .....	<i>L. alpina</i>
Pedicels usually straight or only slightly curved; inner basal leaves usually involute .....	<i>L. intermedia</i>
7(5). Pedicels generally recurved or arched in fruit, or less commonly almost straight; blades of basal leaves rarely more than 4 mm wide .....	<i>L. ludoviciana</i>
Pedicels more or less S-shaped; blades of basal leaves often more than 4 mm wide .....	<i>L. rectipes</i>

Key II.

Basal and cauline leaves different

1. Plants slender annuals, stems erect or ascending, mostly 1-4 dm tall; restricted to Washington County .....	<i>L. tenella</i>
Plants caespitose perennials, stems decumbent to erect, mostly less than 1 (1.5) dm tall; distribution otherwise .....	2
2(1). Plants with caudex definitely branched; known from low to moderate elevations of Duchesne, Emery, and Uintah counties .....	<i>L. subumbellata</i>
Plants with caudex simple or rarely branched; distribution various, but usually of higher elevations .....	3
3(2). Silicles ellipsoid to subglobose or obovoid to obdeltoid, compressed contrary to septum .....	4
Silicles of various shape, but, if as above, compressed parallel to septum .....	5
4(3). Racemes loose to elongated in fruit, often secund; silicles sparingly pubescent with hairs 0.2-0.25 mm broad; plants of Wasatch and Uinta mountains .....	<i>L. utahensis</i>
Racemes short and dense in fruit, not at all secund; silicles moderately pubescent with hairs 0.2-0.35 mm broad; plants of Wasatch Plateau southward .....	<i>L. wardii</i>
5(3). Silicles ovoid, compressed at apex or margins; plants known from northern Wasatch Mountains, from Mt. Nebo northward .....	<i>L. occidentalis</i>
Silicles various but not compressed at apex or margins; plants of various distribution .....	6

- 6(5). Basal leaves angular, blades usually deltoid or hastate, narrowed abruptly to petiole; plants of Rich and possibly Summit counties ..... *L. prostrata*  
 Basal leaves not angular, blades elliptic to obovate, narrowed gradually to petiole; plants of various distribution ..... 7
- 7(6). Silicles either definitely compressed at apex or truncate to emarginate apically; plants from Utah County southward ..... 8  
 Silicles more or less acute apically; plants from Utah County northward ..... 9
- 8(7). Silicles obcordate to obdeltoid, sparingly pubescent; largest basal leaves usually less than 1 cm wide; plants of Carbon, Emery, Sanpete, and Utah counties ..... *L. hemiphysaria*  
 Silicles ellipsoid, densely pubescent; largest basal leaves usually more than 1 cm wide; plants of Garfield, Kane, Sevier, and Tooele counties ..... *L. kingii*
- 9(7). Pedicels loosely S-shaped; silicles sparsely pubescent with appressed or erect hairs; caudex branches lacking conspicuous leaf scars and bases; plants of Cache and Rich counties ..... *L. multiceps*  
 Pedicels straight or curved; silicles densely pubescent with erect hairs; caudex branches with conspicuous scars and/or leaf bases; plants of Davis, Salt Lake, Utah, and Wasatch counties ..... *L. garrettii*

*Lesquerella alpina* (Nutt.) S. Wats. Perennial, arising from simple or branched caudices, these often clothed with marcescent leaf-bases; herbage pubescent with stellate, 4-7-branched hairs; stems 0.1-1 dm tall, rarely more, erect, simple; basal leaves mostly 0.5-5 cm long, 0.1-0.4 cm wide, linear to very narrowly spatulate, gradually narrowed to base; cauline leaves 0.5-2 cm long (or more), 0.1-0.3 cm wide; pedicels 4-10 mm long or more, straight, curved, or S-shaped; sepals 3.5-6 (7) mm long; petals 4-8

mm long, yellow, spatulate; silicles (excluding style) mostly 3-5 mm long, sessile or subsessile, ovoid, more or less compressed apically, valves pubescent externally and sometimes internally also; styles mostly 2-4 mm long; ovules 2-6 per locule.—Ridge tops and rocky slopes from 1830 to 3050 m elevation in central and northeastern Utah.

Two varieties which lack definite diagnostic criteria are represented among our materials.

1. Leaves spatulate, at least some; perhaps not distinct from the next ..... *L. alpina* var. *alpina*  
 Leaves uniformly narrow, linear to linear-spatulate ..... *L. alpina* var. *parvula*

**Var. *alpina*.** [*Vesicaria alpina* Nutt. ex Torr. & Gray; *L. spatulata* Rydb.; *L. curvipes* A. Nels.; *L. alpina* var. *spatulata* (Rydb.) Payson; *L. condensata* var. *laevis* Payson; *L. alpina* var. *laevis* (Payson) C. L. Hitchc.] Ridgetops and alpine areas from 2200 to 3050 m elevation in Uintah and Sanpete counties; widespread northward to Alberta and Saskatchewan.

**Var. *parvula*** (Greene) Welsh & Reveal, stat. nov., based on *Lesquerella parvula* Greene, Pittonia 4:308. 1901. [*L. alpina* ssp. *parvula* (Greene) Rollins & Shaw] Ridgetops and alpine to subalpine areas from 1830 to

2600 m elevation in Duchesne and Daggett counties; Colorado and Wyoming.

It seems probable that all the Utah material designated as *L. alpina* might belong only to var. *parvula*. The var. *condensata* (A. Nels.) C. L. Hitchc. is to be sought in extreme northern Daggett County; it is currently known from just north of the Utah line in Uinta County, Wyoming. The var. *condensata* is a small, tufted plant with the stems barely exerted beyond the leaves.

***Lesquerella arizonica*** S. Wats. [*L. arizonica* var. *nudicaulis* Payson] Perennial, more or less pulvinate-cespitose, with few



northeast of Sunnyside, Range Creek Canyon, S. Welsh & K. Taylor 15139, 23 June 1977 (BRY, isotypes to be distributed). Paratype: Utah, Carbon Co., 6 miles north-northeast of Sunnyside, S. Welsh & K. Taylor 15122, 22 June 1977 (BRY). Sagebrush and woodland communities at 2700 to 2800 m on the West Tavaputs Plateau, Carbon Co.; endemic.

*Lesquerella intermedia* (S. Wats.) Heller. [*L. alpina* var. *intermedia* S. Wats.] Perennial, caespitose, caudex simple or few-branched, branches more or less clothed with marcescent leaf-bases; herbage pubescent with stellate hairs; stems 0.2-1.5 (2.5) dm tall, erect or ascending, simple; basal leaves 1-5 cm long, 0.1-0.2 cm wide, linear or only slightly expanded apically, inner usually involute, tapering gradually to base; cauline leaves 0.8-3.5 cm long, 0.1-0.3 cm wide; pedicels 4-12 mm long, spreading to ascending, straight or curved; sepals 2.8-6.5 mm long; petals 5.5-10.5 mm long, yellow, spatulate; silicles (excluding style) 4-7 mm long, sessile or substipitate, ellipsoid or ovoid, acute and somewhat flattened apically, pubescent externally, glabrous or pubescent within; styles (2) 3-4.5 mm long; seeds (4) 6-8 (10) per locule.—Aspen, mixed conifer, ponderosa pine, and pinyon-juniper communities, from 1525 to 2900 m elevation in Beaver, Emery, Garfield, Sevier, Washington, and Wayne counties; Arizona, New Mexico.

This taxon approaches *L. alpina* on the one hand and *L. rectipes* on the other. Definitive features to separate alpine phases of *L. intermedia* from *L. alpina* are subject to interpretation. Only arbitrary separation seems possible.

*Lesquerella kingii* S. Wats. Perennial, caespitose, caudex usually simple, densely clothed with marcescent leaf-bases; herbage pubescent with stellate hairs; stems 0.3-1.8 dm tall, decumbent to suberect, simple; basal leaves 1.5-4.5 (6) cm long, 0.4-2 cm wide, blade spatulate to oval, obovate or ovate, sharply differentiated from petiole; cauline leaves 0.5-2 cm long, 0.1-0.7 cm wide; pedicels 4-10 mm long or more, curved to straight or S-shaped, ascending to descending; sepals 4-8 mm long; petals 5.5-12 mm

long, yellow, spatulate; silicles (excluding style) 3.5-9 mm long, sessile to substipitate, ellipsoid, compressed apically, valves pubescent externally, pubescent to glabrous within; styles 2-5 mm long; seeds 4-8 per locule.—Ponderosa pine and juniper-pinyon communities at low to moderate elevations in Garfield, Millard, Sevier, Tooele, and Washington counties; Nevada, California and Oregon.

Our material, which is not always distinguishable from *L. wardii*, belongs to var. *parvifolia* (Maguire & Holmgren) Welsh and Reveal, comb. nov., based on *Lesquerella occidentalis* var. *parvifolia* Maguire & Holmgren, Madroño 11: 179. 1951 [*L. latifolia* A. Nels.; *L. barnebyi* Maguire; *L. kingii* ssp. *latifolia* (A. Nels.) Rollins & Shaw]. The var. *cordiformis* (Rollins) Maguire & Holmgren is to be sought in the deserts of extreme western Utah.

*Lesquerella ludoviciana* (Nutt.) S. Wats. [*Myagrum argenteum* Pursh; *Alyssum ludovicianum* Nutt.; *L. argentea* (Pursh) MacMillan, not *L. argentea* (Schauer) S. Wats.] Perennial, loosely caespitose, caudex simple to many-branched, branches clothed with marcescent leaf-bases; herbage pubescent with stellate hairs; stems 0.7-3 (4) dm tall, ascending to erect or outer decumbent, simple; basal leaves 1-9 cm long, (0.1) 0.2-0.8 cm wide, spatulate to oblanceolate or appearing linear when folded; cauline leaves 1-6 cm long, 0.1-0.6 cm wide; pedicels 5-15 mm long or more, straight or curved, ascending to recurved; sepals 4-7 mm long; petals 5-10 mm long, yellow, oblanceolate to obovate; silicles (excluding style) 3-6 mm long, sessile or nearly so, subglobose or obovoid, valves pubescent externally and usually pubescent within; styles 3-5 mm long; seeds 2-8 per locule.—Pinyon-juniper, sagebrush, and upwards to spruce-fir woodlands, from 1370 to 2750 m elevation in Daggett, Duchesne, Garfield, Kane, and Uintah counties; Minnesota and Illinois westward to Montana, and southward to Nevada, Colorado, and Kansas.

*Lesquerella multiceps* Maguire. Perennial, caespitose, caudex simple or several- to many-branched, more or less clothed with marcescent leaf-bases; herbage pubescent

with stellate hairs; stems 0.3-2 dm long, rarely more, prostrate to erect; basal leaves 1-6 cm long, 0.4-1.5 (2) cm wide, blades elliptic to obovate, differentiated from long slender petioles; cauline leaves 0.4-2 cm long, 0.1-0.5 cm wide; pedicels 3-10 mm long, S-shaped; sepals 4.3-7 mm long; petals 5-10 mm long, yellow, spatulate; silicles (excluding style) 3-5.5 mm long, sessile or nearly so, ovoid, valves pubescent externally, glabrous within; styles 3-6.5 mm long; ovules 2-4 per locule.—Ridges and upper slopes from 1830 to 3050 m elevation in Cache, Davis, and Rich counties; Idaho, Wyoming.

*Lesquerella occidentalis* S. Wats. Perennial, caespitose, caudex simple or few-branched, more or less clothed with marcescent leaf-bases; herbage pubescent with stellate hairs; stems 0.2-1.5 dm long, rarely more, prostrate, decumbent, ascending or erect, usually simple; basal leaves 0.5-8 cm long, 0.3-1.5 cm wide, blades spatulate to oval or obovate, differentiated from petioles; cauline leaves 0.4-1.5 cm long, 0.1-0.8 cm wide; pedicels 3-10 mm long or more, sigmoid or straight, ascending; sepals 4-7 mm long; petals 6-10 mm long, yellow, spatulate; silicles (excluding style) 4-6 mm long, ellipsoid, usually compressed at apex, valves pubescent externally and usually pubescent within; styles 2-5 mm long; seeds 2-8 per locule.—Limestone cliffs and talus slopes from 1525 to 3660 m elevation in Box Elder and Juab (Mt. Nebo) counties; Idaho and Utah to California and Oregon.

Our material belongs to var. *cinerascens* Maguire and Holmgren [*L. occidentalis* ssp. *cinerascens* (Maguire & Holmgren) Rollins & Shaw].

*Lesquerella prostrata* A. Nels. Perennial, caespitose, caudex simple or few-branched, branches more or less clothed with marcescent leaf-bases; herbage pubescent with stellate hairs; stems 0.3-1.5 dm tall, decumbent to ascending, simple; basal leaves 1-5 cm long, 0.5-1 (1.5) cm wide, blades deltate to hastate, more or less angular, differentiated from slender petioles; cauline leaves 0.4-1.5 cm long, 0.1-0.5 cm wide; pedicels 4-10 mm long, curved to straight or S-shaped, spreading; sepals 5-6 mm long; petals 5-9

mm long, yellow, spatulate; silicles (excluding style) 4-7 mm long, sessile or nearly so, ovoid to ellipsoid, not flattened apically, valves pubescent externally, glabrous or sparsely hairy within; styles 3-6 mm long; seeds 2-4 per locule.—Sagebrush community, especially on dry shaly slopes from 1830 to 2440 m elevation in Rich (and to be sought in Summit) County; Wyoming and Idaho.

*Lesquerella rectipes* Woot. & Standl. Perennial, loosely caespitose, caudex simple or few-branched, branches more or less clothed by marcescent leaf-bases; stems 0.4-4 dm tall or more, decumbent to ascending or erect, simple or branched; basal leaves 1-8 (10) cm long, 0.3-1.2 cm wide, oblanceolate to elliptic, entire or toothed, tapering gradually to base; cauline leaves 0.6-3 cm long, 0.2-1 cm wide; pedicels 4-10 mm long or more, straight or S-shaped, spreading to ascending or recurved; sepals 4-8 mm long; petals 6-10 mm long or more, yellow, spatulate to obovate; silicles (excluding style) 4-7 mm long, substipitate to subsessile, ovoid to ellipsoid, pubescent externally and glabrous or pubescent within; styles 2-7 mm long; seeds 4-8 per locule.—Pinyon-juniper, grasslands, warm desert shrub, and ponderosa pine communities from 1220 to 2440 m elevation in Carbon, Emery, Garfield, Grand, Kane, San Juan, Uintah, Washington and Wayne counties; Utah and Arizona eastward to Colorado and New Mexico.

This is the most common of the tall species of *Lesquerella* in southeastern Utah.

*Lesquerella rubricundula* Rollins. [*L. hitchcockii* ssp. *rubicundula* (Rollins) Maguire & Holmgren] Plants perennial, loosely caespitose, not matted, caudex simple or with few to several branches, branches clothed with marcescent leaf bases; herbage pubescent with stellate hairs; stems 0.1-0.5 dm tall, erect, simple; leaves mainly basal, 0.3-1.2 cm long, 0.1-0.2 cm wide, not differentiated into blade and petiole; pedicels 1-6 mm long, straight or curved, ascending; sepals 3.2-4.5 mm long; petals 4.5-7 mm long, yellow, spatulate; silicles (excluding style) 3-5 mm long, sessile to substipitate, ovoid, valves glabrous externally and within; styles



2.8-3.5 mm long; ovules 2-4 per locule.—Mixed conifer woodlands, on White and Pink limestone member of the Wasatch Formation from 2440 to 3050 m elevation in Garfield (type locality at Red Canyon) and Iron counties; endemic.

*Lesquerella subumbellata* Rollins. Perennial, caespitose, caudex several-branched, branches clothed with marcescent leaf bases and often with leaves as well; herbage pubescent with stellate hairs; stems 0.1-0.8 (1) dm tall, ascending to erect, simple; basal leaves 0.8-3 cm long, 0.2-0.6 (1) cm wide, at least outer and usually most of them obovate-spatulate, gradually tapering to petiole; cauline leaves 0.3-2 cm long, 0.1-0.4 cm wide; pedicels 2-5 mm long, straight or curved, ascending; sepals 3-4.5 mm long; petals 5-6 mm long, yellow, spatulate; silicles (excluding style) 3.5-5 mm long, sessile, ellipsoid, valves pubescent externally; styles 1.5-2.5 mm long; seeds 2-6 per locule.—Pinyon-juniper and sagebrush communities from 1680 to 1980 m elevation in Duchesne and Uintah (type locality 18 miles north of Vernal) counties; Colorado, Wyoming.

Rollins and Shaw (1973) place this taxon within the range of variation of *Lesquerella alpina*. That disposition ignores the basic continuity of *L. subumbellata*, and likewise denies the apparent relationship of *L. alpina* in quite another direction, i.e., with *L. internedia*. The uniformly broad blades of basal leaves, although tenuous as a diagnostic feature, are on the order of other diagnostic features in this critical genus.

*Lesquerella tenella* A. Nels. [*L. gordonii* var. *sessilis* S. Wats.; *L. palmeri* of Utah references, not S. Wats.] Annual, herbage pubescent with stellate hairs; stems 1-5 dm tall or more, spreading-decumbent to erect, simple or branched; basal leaves 1.5-6 cm long, 0.2-1.5 cm wide, blades elliptic, sometimes toothed, differentiated from petiole; cauline leaves 0.4-4 cm long, 0.2-1 cm wide; pedicels 4-12 (18) mm long or more, S-shaped, spreading to recurved; sepals 3.5-7 mm long; petals 5-10 mm long, yellow to orange, orbicular to obovate; silicles (excluding style) 3.5-5 mm long, sessile to substipitate, globose to obovoid, valves pu-

bescent externally and internally; styles 2-4.5 mm long; ovules 2-6 per locule.—Blackbrush, cresote brush, and Joshua tree communities at lower elevations in Washington County (the type of var. *sessilis* is from St. George); Nevada and California south to Mexico.

*Lesquerella tumulosa* (Barneby) Reveal. [*L. hitchcockii* ssp. *tumulosa* Barneby] Perennial, pulvinate-caespitose, densely matted, caudex many-branched, branches clothed with numerous marcescent leaves and leaf bases; herbage pubescent with stellate hairs; stems 0.1-0.4 dm tall, erect, simple; leaves mainly basal, 0.2-1 (1.5) cm long, (0.07) 0.1-0.15 (0.2) cm wide, not differentiated into blade and petiole; pedicels 2-5 mm long, straight or S-shaped, spreading to ascending; sepals 2.8-4 mm long; petals 5-7 mm long, yellow, spatulate; silicles (excluding style) 2.7-3.8 mm long, substipitate, ovoid, valves glabrous externally and internally; styles 1.9-2.7 mm long; ovules 2-4 per locule.—White, bare shale knolls (Winsor Member of the Carmel Formation) among scattered juniper in a *Bouteloua* grassland, Kane County; endemic.

This plant was included with *L. rubicundula* by Rollins and Shaw (1973), but is distinct morphologically, spatially, and substrate-wise from that taxon as noted by Reveal (Great Basin Nat. 30:94-98. 1970).

*Lesquerella utahensis* Rydb. Perennial, caespitose, caudex usually simple, more or less clothed with persistent leaf-bases; herbage pubescent with stellate hairs; stems 0.2-1.5 dm tall or more, decumbent to ascending or erect; basal leaves 1.2-6.5 cm long, 0.1-0.5 cm wide; pedicels 3-10 mm long, sigmoid or curved, ascending; sepals 4.5-5.7 (7) mm long; petals 6.5-9 mm long, yellow, spatulate; silicles (excluding style) 3.5-4.5 (6) mm long, substipitate to sessile, globose-ellipsoid, compressed contrary to partition, valves pubescent externally, glabrous internally; styles 4-5.5 (6.5) mm long; seeds 3-6 per locule.—Openings among spruce-fir woodlands from 2600 to 3350 m elevation in Duchesne, Salt Lake, Summit, Uintah, Utah (the type is from American Fork Canyon), and Wasatch counties; endemic.

*Lesquerella wardii* S. Wats. Perennial, caudex usually simple, clothed with marcescent leaf-bases; herbage pubescent with stellate hairs; stems 0.2-2 dm tall, rarely more, decumbent to ascending or erect, simple; basal leaves 1-4.5 (6) cm long, 0.3-1.5 (2) cm wide, blades deltoid to orbicular or elliptic, differentiated from slender petiole; pedicels 2-7 mm long, straight, curved, or S-shaped, ascending; sepals 4-6.3 (8) mm long; petals (5.5) 6-9 (11) mm long, yellow, spatulate; silicles (3.5) 4-6.8 (8) mm long, substipitate to sessile, ellipsoid or ovoid, not compressed apically, pubescent externally and usually so internally; styles (1) 2.2-4 (7) mm long; seeds 2-8 per locule.—Spruce-fir woodlands, meadows, pinyon-juniper, and desert shrub communities from 1830 to 3400 m elevation in Beaver, Garfield (type area is Aquarius Plateau), Iron, Kane, Millard, Piute, Sevier, and Washington counties.

*Lesquerella wardii* is most similar to the partially sympatric *L. kingii* var. *parvifolia* from which it is distinguished inter alia in the silicles being rounded, not compressed, apically.

#### LOBULARIA Desv.

##### Nom. Cons.

Plants annual or rarely biennial, pubescent with malpighian hairs, arising from taproots; leaves alternate, simple, entire, petiolate or sessile, not auriculate; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, white, pink, or lavender; stamens 6, filaments lacking glandular processes; style short, stigmas capitate; fruit a silicle, about as broad as long, compressed parallel to septum, dehiscent, valves 1-nerved; seeds 1 per locule.

A European genus of 5 species.

*Lobularia maritima* (L.) Desv. [*Clypeola maritima* L.; *Alyssum maritimum* (L.) Lam.] Sweet Alyssum. Annual, stems spreading-decumbent or ascending to erect, usually much branched, 0.8-3 dm long or more; leaves linear-oblongate, 0.8-3 (4) cm long, 0.1-0.4 cm wide, strigose on both surfaces; pedicels spreading-ascending, 5-9 mm long; sepals 1-1.5 (2) mm long, green or purplish, pubescent; petals 2.5-4 mm long, white,

pink or lavender, the blades obovate; silicles 2.5-3.5 mm long and about as broad, valves sparingly strigose; styles 0.3-0.6 mm long.—Ornamental border plant with sweetly scented flowers, escaping and occasionally persistent; introduced from Europe.

#### LUNARIA L.

Plants annual or biennial, pubescent with simple or with some forked hairs, arising from taproots; leaves usually alternate and basal, simple, dentate to lobed, petiolate, not auriculate; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, pink to lilac or blue or purplish; stamens 6, filaments lacking glandular processes; style elongate, persistent, stigma capitate, bilobed; fruit a stipitate silicle, about as broad as long, compressed parallel to septum, dehiscent, valves reticulately veined; seeds 3-5 per locule.

A small Eurasian genus of 2 or 3 species.

*Lunaria annua* L. Honesty; Moonwort; Satin-flower. Plants with one to several stems, these simple or branched, mostly 4-10 dm tall or more, pubescent with simple, and rarely with some forked, hairs; leaves 2.5-10 (15) cm long, 1.5-8 cm wide, rarely more, ovate to lance-ovate or cordate, dentate to lobed, pubescent with simple or rarely forked hairs; pedicels 10-22 mm long, spreading-ascending, pubescent; sepals 6-8 mm long, greenish or variously suffused, sparsely pubescent; petals 14-20 mm long, pink to lilac or blue to purplish, obovate; silicles 32-45 mm long, 25-35 mm wide, borne on stipes 7-12 mm long, much flattened, valves glabrous; styles 6-8 mm long.—Ornamental, cultivated for the showy flowers and distinctive fruiting inflorescences, occasionally escaping; introduced from Europe.

#### MALCOMIA (L.) R. Br.

##### Nom. Cons.

Plants pubescent with forked or 3-rayed hairs, annual, from taproots; leaves alternate and basal, simple, sinuate-dentate, cauline ones petiolate to sessile, not auriculate; flowers racemose, pedicels seldom subtended by bracts; sepals 4, tardily de-

ciduous; petals 4, pink to lavender; stamens 6, filaments lacking glandular processes; style tapering, stigma oblique; fruit a silique, many times longer than broad, subterete, dehiscent, valves nerveless; seeds uniseriate.

About 30 species of Europe and Africa, with 2 or 3 species in North America as weeds.

*Malcolmia africana* R. Br. in Ait. Plants decumbent-ascending to erect, stems 0.3-4 dm tall, simple or branched almost throughout, pubescent with forked or 3-rayed hairs; leaves mainly basal to mainly cauline, 1.2-9 cm long, 0.3-2.3 cm wide, oblanceolate to elliptic, sinuate-dentate, petiolate to sessile, not auriculate; pedicels spreading, 1-2 mm long, pubescent; sepals 3.7-5.2 mm long, often reddish or purplish, pubescent; petals 6.2-9.5 mm long, pink to lavender, rounded apically, spreading; siliques 33-66 mm long, straight, pubescent; style up to 1 mm long, stigma oblique.—Roadsides, foothills, and other disturbed sites at lower elevations in Cache, Carbon, Emery, Garfield, Grand, Juab, Kane, Millard, Salt Lake, San Juan, Sevier, Tooele, Uintah, Utah, and Washington counties, and probably throughout the state; widespread throughout the Great Basin and adjacent areas of the western United States; adventive from Africa.

#### NASTURTIIUM R. Br.

Plants glabrous perennials from subrhizomatous stolons; leaves alternate, simple or more pinnately compound, petiolate and auriculate; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, white; stamens 6, filaments lacking glandular processes; styles stout, well developed, stigma capitate, bilobed; fruit a silique, several times longer than broad, oblong, somewhat compressed parallel to septum, the valves 1-nerved; seeds several to many, biseriate.

Perhaps 50 species of moist places in the temperate zones.

*Nasturtium officinale* R. Br. in Ait. [*Sisymbrium nasturtium-aquaticum* L.; *Rorippa nasturtium-aquaticum* (L.) Schinz & Thell.] Watercress. Plants submersed or emergent, succulent stems (0.3) 1-8 (10) dm

long or more, glabrous; leaves 1-10 cm long, terminal lobe usually largest, falsely petiolate and narrowly auriculate-clasping basally; pedicels 5-13 (20) mm long, spreading to spreading-ascending, glabrous or pubescent; sepals 2-3 mm long, green or tips white, glabrous; petals 3-4.7 mm long, white, rarely with veins purplish, oblanceolate; siliques 10-18 (25) mm long, 1.8-2.4 mm wide; styles 0.7-1.2 mm long.—Seeps, springs, and sluggish streams, usually in flowing water at moderate elevations in Cache, Garfield, Grand, Iron, Millard, Salt Lake, San Juan, Summit, Utah, Wasatch, Washington, Wayne, and Weber counties, and probably throughout the state; widely established in North America; introduced from Europe.

Watercress is used as a salad plant.

#### PARRYA R. Br.

Plants perennial, glabrous, pubescent with stipitate-glandular hairs, arising from taproots and with simple to branched caudices; leaves mainly basal, simple, dentate, tapering basally, not auriculate; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, pink to lavender; stamens 6, filaments lacking glandular processes; styles stout, persistent, stigmas bilobed; fruit a silique, usually several times longer than broad, oblong, constricted between seeds, strongly compressed parallel to septum, valves 1-nerved; seeds 1 to several per locule.

An Asian and North American genus of perhaps 25 species.

*Parrya rydbergii* Botsch. [*P. platycarpa* Rydb., not Hook. f. & Thomas] Plants rosulate, low perennials, caudex clothed with marcescent leaf bases; stems scapose, 0.7-1.2 dm tall, 2-8 cm to base of raceme, herbage stipitate-glandular; leaves 3-10 cm long, 0.6-2 cm wide, oblanceolate to elliptic; flowers racemose, 3-7 (10); pedicels 4-20 mm long, stout, steeply ascending; sepals 7.2-9.3 mm long, purplish, stipitate-glandular or glabrous; petals 16-23 mm long, pink to lavender, cuneate-spatulate, emarginate; siliques 25-47 mm long, 3-3.5 mm wide, straight or curved, midnerve prominent, glabrous or stipitate-glandular; style 0.3-0.6

mm long, stigma deeply bilobed; seeds 1-4 per locule.—Talus slopes, krumholz communities, and alpina tundra sites in the Uinta Mountains from 3200 to 3720 m elevation in Daggett, Duchesne, Summit, and Uintah counties; endemic.

This is one of our most unique and attractive Utah endemic species, and one that may be worthy of cultivation if low-elevation cultivars could be developed.

PHYSARIA (Nutt.)  
A. Gray

Plants stellate pubescent perennials, arising from taproots; leaves mainly basal, cauline ones much reduced, alternate, simple, tapering basally or merely sessile, not auriculate; flowers racemose, pedicels straight, curved, sigmoid, spreading or descending, not subtended by bracts; sepals 4, deciduous; petals 4, yellow, rarely purple, rounded; stamens 6, filaments lacking glandular processes; style slender, stigma capitate; fruit a sessile, bladdery-inflated silicle, often broader than long, varying in outline, compressed (if at all) contrary to

septum, valves veinless; seeds 2-6 per locule, biseriate.

A genus of perhaps 15 species restricted to western North America.

The diagnostic features used to segregate entities of this genus are mainly based on the shape of the mature silicle and the length of the style. These features are subject to variation within rather broad limits, and not all specimens will fit neatly into the following key. Immature specimens are particularly difficult to place, and strictly fruiting collections are often more readily definable than flowering collections.

Mulligan, G. A. 1967. Cytotaxonomy of *Physaria acutifolia*, *P. chambersii*, and *P. newberryi* (Cruciferae). *Canad. J. Bot.* 45:1887-1898.

Payson, E. B. 1918. Notes on certain Cruciferae. *Physaria*. *Ann. Missouri Bot. Gard* 5:143-147.

Rollins, R. C. 1939. The cruciferous genus *Physaria*. *Rhodora* 41:392-415.

Waite, S. B. 1973. A taxonomic revision of *Physaria* (Cruciferae) in Utah. *Great Basin Nat.* 33:31-36.

- 1. Styles 2-3 (4) mm long; valves of silicles sharply angled at maturity; plants of Grand, Kane, San Juan, and Washington counties ..... *P. newberryi*  
Styles mostly 4-8 mm long or more; valves of silicles obtusely angled to rounded at maturity; distribution various ..... 2
- 2(1). Basal leaves sinuate-dentate to lobed, sometimes with some entire; cauline leaves often toothed; plants endemic to Uintah Basin ..... *P. grahamii*  
Basal leaves entire or rarely sinuate-dentate; cauline leaves entire; plants of broad distribution ..... 3
- 3(2). Sinuses of silicles indented above and below, when immature equally rounded to apex and base; valves rounded, not angled at maturity; plants mainly of the Colorado River drainage system ..... *P. acutifolia*  
Sinuses of silicles only slightly indented to rounded below, deeply indented above, when immature tapering to base and obcordate in outline; valves obtusely angled at maturity; plants mainly of Great Basin and valleys of Virgin River drainage system ..... *P. chambersii*

*Physaria acutifolia* Rydb. Plants perennial, caespitose, caudex usually simple, clothed with marcescent leaf bases; stems 0.3-2 (2.5) dm long, decumbent to ascending or erect, simple; basal leaves 1.7-9.5 cm long, 0.7-3 cm wide, blade orbicular to ovate or obovate, less commonly lance-ellip-

tic, entire, angular, or toothed; cauline leaves greatly reduced; pedicels mostly 7-16 mm long, ascending to descending; sepals 5.2-8.7 mm long; petals 7.5-12.5 mm long, yellow or purple, spatulate; silicles bladdery-inflated, sinuses indented above and somewhat less so below, valves 7-15 mm



long in fruit, surface rounded in cross-section, papery to membranous; styles 3.8-7 mm long. —Desert shrub, pinyon-juniper, sagebrush, and oak communities from 1220 to 2440 m elevation in Carbon, Daggett, Duchesne, Emery, Garfield, Grand, Kane, San Juan, Sevier, Uintah, and Wayne coun-

ties; Idaho and Utah eastward to Wyoming, Colorado, and New Mexico.

This very critical species contacts *P. chambersii* to the west where apparent intermediates are known; a similar situation occurs southward involving *P. newberryi*. Two varieties are known.

1. Flowers clear yellow, rarely fading purplish; silicles definitely indented below; plants widespread ..... *P. acutifolia* var. *acutifolia*
- Flowers purple or tinged purple; silicles only slightly indented below; plants known only from the Book Cliffs area of Grand County ..... *P. acutifolia* var. *purpurea*

**Var. *acutifolia*.** [*P. didymocarpa* var. *australis* Payson; *P. australis* (Payson) Rollins] Plants widespread, our common phase.

**Var. *purpurea*** Welsh & Reveal, var. nov. Plantis similis *P. acutifolia* var. *acutifolia* sed petalis purpureis et siliculis pauci indentibus inferioribus. Type: Grand County, Utah, Sego Canyon, 5 miles north of Thompson, 1 May 1968, S. L. Welsh 6902. Holotypus, BRY. Paratype: Utah, Grand County, about 3 miles north of Thompson, 5 May 1971, S. L. Welsh 10966 (BRY). Known only from the type locality.

***Physaria chambersii*** Rollins. [*P. chambersii* var. *membranacea* Rollins] Plants perennial, caespitose, the caudex usually simple, clothed with marcescent leaf bases; stems 0.3-2.5 dm long, decumbent to ascending or erect, simple; basal leaves 1-7.5 (13) cm long, 0.3-3.5 cm wide, blade orbicular to ovate, obovate, elliptic or oblanceolate, entire, angular or toothed; cauline leaves greatly reduced; pedicels mostly 4-18 mm long, ascending to descending; sepals 6-7.2 mm long; petals 8-13 mm long, yellow, spatulate; silicles bladderly-inflated, upper sinus deeply indented, lower shallow or lacking, valves 11-17 mm long in mature fruit, surface roughly angled at edges, angles obtuse, papery to membranous; styles 4-8 mm long. —Desert shrub, sagebrush, oak-juniper, pinyon-juniper, aspen-mixed conifer, ponderosa pine, and spruce-fir communities from 1200 to 2900 m elevation in Beaver, Emery, Garfield, Iron, Juab, Kane, Millard, Piute, Sanpete, Sevier, Summit, Tooele, Utah, and Washington counties;

Arizona and Utah west to California and Oregon.

***Physaria grahamii*** Morton. Plants perennial, caespitose, caudex simple, clothed with marcescent leaf bases; stems 0.5-1.5 dm long, ascending to erect, simple; basal leaves 2-15 cm long, 0.8-5 cm wide, blade oblanceolate to spatulate, toothed to pinatifid; cauline leaves often toothed, much reduced; pedicels 6-20 mm long, ascending; sepals 4.5-5 mm long; petals about 6.5 mm long, yellow, spatulate; siliques strongly inflated, cordate, to 9 mm long and 10 mm wide; styles 3.5-7 mm long. Duchesne, Uintah, and Grand Cos.; Colorado.

This distinctive taxon is still only poorly understood. We have seen only the holotype (Chandler Canyon, 3 Aug 1935, *Graham* 9976, US), plus fruiting material gathered in August 1976 (Welsh et al. 14414, BRY). A second collection made by Welsh (Welsh & Higgins 6239, BRY) from Garfield County, Colorado, seems to belong to this taxon. The species appears to be endemic to soils derived from the Green River Shale Formation in the southern portion of the Uinta Basin and along the escarpments south of the Basin proper.

***Physaria newberryi*** A. Gray. [*Coulterina newberryi* (A. Gray) Kuntze; *P. didymocarpa* var. *newberryi* (A. Gray) M. E. Jones] Plants perennial, caespitose, caudex simple, clothed with marcescent leaf bases; stems 0.4-2.2 dm long, decumbent to ascending or erect; basal leaves 2-7.5 cm long, 0.8-4 cm wide, blade obovate to orbicular, ovate, or spatulate, angled, indistinctly toothed or more commonly entire; cauline leaves much re-



duced, entire; pedicels 5-17 mm long, ascending to descending; sepals 6-8.5 mm long; petals 6.5-12 mm long, yellow, spatulate; silicles bladderly-inflated, upper sinus deeply indented, lower sinus shallow or lacking, valves 8-11 mm long or more in fruit, sharply angled at margins, papery; styles 2-3.5 mm long. —Warm desert shrub upwards to ponderosa pine communities from 1200 to 2000 m in Grand, Kane, San Juan and Washington counties; Arizona and New Mexico.

Where this species contacts either *P. chambersii* or *P. acutifolia* there are transitional specimens. Style length forms a continuum from one entity to another, and errors in determination are possible, especially in material which lack mature fruits.

#### RAPHANUS L.

Plants pubescent with simple hairs, annuals, from tuberous taproots; leaves alternate and basal, simple, lyrate-pinnatifid, cauline ones petiolate to sessile, not auriculate; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, white or pink to lavender; stamens 6, filaments lacking glandular processes; styles apical on a tapering sterile beak, stigma minute, bilobed; fruit a silique, many times longer than broad, terete, indehiscent, breaking irregularly at maturity into segments, valves several-grooved; seeds uniseriate.

About 6 Eurasian species.

*Raphanus sativus* L. Radish. Plants erect, stems mostly 4-10 dm tall, simple or more

commonly branched, more or less hispid with simple hairs; leaves basal and cauline, mostly 2-18 cm long, 0.5-6.5 cm wide, lyrate-pinnatifid, hispid, cauline ones reduced upwardly; pedicels 10-20 mm long or more, spreading to ascending; sepals 7-9 mm long, green to reddish or purplish, glabrous; petals 12-20 mm long, white to pink or lavender; silicles 30-60 mm long, 5-10 mm wide, beak 10-25 mm long. —Cultivated for the edible roots, rarely escaping but usually not persisting; introduced from Europe.

The yellow-flowered species, *R. raphanistrum* L., is an occasional weed which is to be expected in the state.

#### RORIPPA Scop.

Plants glabrous to hirsute with simple hairs, annual, biennial or perennial, from taproots or rhizomes; leaves alternate and basal, lyrate-pinnatifid, sinuately toothed, lobed, or uppermost subentire, petiolate to sessile, auriculate in some; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, yellow, fading pinkish in some, truncate to rounded apically; stamens 6, filaments lacking glandular processes; style prominent to almost lacking, stigma capitate; fruit a sessile silique or siliacle from one to several times longer than broad, terete or somewhat flattened; seeds several to numerous, mostly biseriate.

A genus of perhaps 40 species on all major continents, but mainly in the northern temperate regions of the world.

Stuckey, R. L. 1972. Taxonomy and distribution of the genus *Rorippa* (Cruciferae) in North America. *Sida* 4:279-430.

1. Plants perennial, with creeping rhizomes; petals 2.5-5 mm long ..... 2  
Plants annual or biennial, rarely perennial, from taproots; petals 0.7-2.5 (3)  
mm long ..... 3
- 2(1). Plants 3-9 dm tall; sepals 1-2 mm long; fruits globose, usually seedless; introduced weeds of cultivated lands ..... *R. austriaca*  
Plants 1-3 dm tall; sepals 2-4 mm long; fruit ovoid to oblong, bearing seeds; indigenous plants of saline valley bottoms ..... *R. sinuata*
- 3(1). Siliques globose, 1-1.3 times longer than broad; partition circular in outline ....  
..... *R. sphaerocarpa*  
Siliques cylindroid or tapering at the apex, 2-5 times longer than wide or more; partition oblong to triangular in outline ..... 4

- 4(3). Plants prostrate to decumbent, stems 2 dm long or less; siliques tapering to apex, minutely papillose ..... *R. tenerrima*  
Plants prostrate to decumbent or erect, stems often over 2 dm long; siliques cylindroid or tapering to apex, smooth ..... 5
- 5(4). Plants erect, stems mostly 3-10 dm long; pedicels usually as long as fruit, mostly 4-12 mm long ..... *R. islandica*  
Plants prostrate, decumbent, ascending, or erect, mostly 2-5 dm tall; pedicels usually shorter than fruit, mostly 2-4 mm long ..... *R. curvipes*

*Rorippa austriaca* (Crantz) Besser. [*Nasturtium austriacum* Crantz; *Radicula austriaca* (Crantz) Small] Austrian field-cress. Perennial, from thickened rhizomes, stems 3-9 dm tall, erect, slender, finely puberulent; leaves 3-6 cm long, oblong to oblong-ovate, unequally serrate, glabrous, narrowed to a petiolelike auriculate base; racemes 7-12 cm long, in terminal panicles; pedicels 4-10 mm long in fruit, spreading-ascending; sepals 1-2 mm long; petals 3-15 mm long, yellow; siliques subglobose, 1.5-3 mm long. —Occasional to rare weed of cultivated places, reported for south-central Utah by Stuckey (1972).

*Rorippa curvipes* Greene. Annual or short-lived perennial, arising from taproots, stems (1) 2-5 dm long, prostrate to decum-

bent, ascending or erect, glabrous; leaves (2) 4-8 (12) cm long, 0.3-1.5 cm wide, oblong, obovate, spatulate or oblanceolate, entire, crenate, irregularly serrate, or lower ones pinnatifid, petiolate to sessile, often auriculate; racemes 4-15 cm long, in axillary and terminal racemes; pedicels mostly 2-5 mm long in fruit, spreading to ascending or descending; sepals 0.8-1.7 mm long; petals 0.5-2.8 mm long, yellow, rarely fading pinkish; siliques 1.8-8.7 mm long, 0.6-2.3 mm wide; style 0.2-1.3 mm long. —Moist sites from low to high elevation throughout much of Utah; western North America from southern Canada to Arizona and New Mexico.

Three more or less distinct varieties are recognized.

1. Petals 1.2-2.8 mm long, longer than sepals; siliques usually acute; plants prostrate to decumbent ..... *R. curvipes* var. *alpina*  
Petals mostly 0.5-1.5 mm long, about as long as or shorter than sepals; siliques acute or obtuse; plants prostrate to decumbent or erect ..... 2
- 2(1). Siliques 1.4-5 mm long, acute to somewhat obtuse; petals 0.5-1 (1.3) mm long  
*R. curvipes* var. *curvipes*  
Siliques 3.5-8 mm long or more, obtuse apically; petals 1-1.5 mm long .....  
..... *R. curvipes* var. *integra*

**Var. *alpina*** (S. Wats.) Stuckey. [*Nasturtium obtusum* var. *alpinum* S. Wats.; *R. obtusa* var. *alpina* (S. Wats.) Britton; *R. alpina* (S. Wats.) Rydb.; *Radicula alpina* (S. Wats.) Greene] Bogs and seeps from 1980 to 3050 m elevation in Cache, Duchesne, Garfield, Summit (type from head of Bear River Canyon), and Utah counties; Idaho, Wyoming, and Colorado.

**Var. *curvipes***. [*Cardamine palustris* var. *jonesii* Kuntze; *R. underwoodii* Rydb.; *Radicula curvipes* (Greene) Greene; *Radicula underwoodii* (Rydb.) Heller; *Rorippa obtusa*

and *Rorippa curvisiliqua* of Utah authors] Ponds, streams, and seep margins from 1370 to 2440 m elevation in Garfield, Grand, Kane, Piute, Salt Lake (type of var. *jonesii* from City Creek Canyon), Sanpete, Sevier, Utah, Wasatch, and Washington counties; Alberta and Saskatchewan east to Wisconsin and south to California, Arizona, New Mexico, and Kansas.

**Var. *integra*** (Rydb.) Stuckey. [*R. integra* Rydb.; *Radicula integra* (Rydb.) Heller; *Rorippa obtusa* var. *integra* (Rydb.) Marie-Victorin] Stream banks and beaches from 2440



wide, entire, crenate, serrate or pinnatifid; racemes 2-10 cm long, in axillary and terminal racemes; pedicels 1.5-4.2 mm long, ascending to recurved, often secund; sepals 0.7-1.3 mm long; petals 0.6-1.2 mm long, yellow, fading pinkish; siliques subglobose, 1-2.5 mm long and as wide or 1-1.3 times longer than broad; styles 0.4-0.7 mm long. —Moist sites at lower elevations in Garfield and Utah counties where evidently rare; Arizona and New Mexico northward to Wyoming.

This species approaches both *R. curvipes* and *R. islandica* var. *hispida*. Despite the apparent convergences, *R. sphaerocarpa* appears to exist as a functional entity and not just as an extreme morphological phase of either of the two taxa it approaches.

*Rorippa tenerrima* Greene [*Radicula tenerrima* (Greene) Greene] Annual, arising from taproots, the stems 0.4-2 dm long, decumbent to prostrate, glabrous; leaves 1-5 (8) cm long, 0.5-1.5 cm wide, lyrate-pinnatifid to subentire; racemes 2-10 cm long, in axillary and terminal racemes; pedicels 1-3 (4) mm long, ascending to spreading; sepals 0.7-1.2 mm long; petals 0.6-0.8 mm long, yellow; siliques 3-8 mm long, 0.8-2 mm wide, tapering to apex; styles 0.3-1 mm long. —Marshy sites at lower to mid elevations in Cache, Garfield, Kane, Iron, Salt Lake, Sevier, and Washington counties; Washington eastward to North Dakota and southward to Mexico.

#### SCHOENCRAMBE Greene

Plants glabrous, perennial, arising from a caudex and creeping rhizome; leaves alternate and some often basal, pinnatifid below, becoming entire above or all entire, petiolate to sessile, not auriculate; flowers racemose, the pedicels not subtended by bracts; sepals 4, deciduous; petals 4, yellow; stamens 6, filaments lacking glandular processes; style almost lacking, stigma expanded, bilobed; fruit a sessile silique, many times longer than broad, terete, valves indistinctly 1-nerved; seeds uniseriate.

A western American genus of 2 species.

*Schoenocrambe linifolia* (Nutt.) Greene. [*Nasturtium linifolium* Nutt.; *N. punilum* Nutt., not St. Hilaire; *Sisymbrium linifolium*

(Nutt.) Nutt ex Torr. & Gray; *Sisymbrium pygmaeum* Nutt. ex Torr. & Gray; *Erysimum glaberrimum* Hook. & Arn.; *Schoenocrambe pygmaea* (Nutt.) Greene; *Schoenocrambe pinnata* Greene; *Schoenocrambe decumbens* Rydb.; *Schoenocrambe linifolia* var. *pinnata* (Greene) A. Nels. in Coult. & Nels.; *Sisymbrium decumbens* (Rydb.) Blankinship; *Sisymbrium linifolium* var. *pinnatum* (Greene) O. E. Schulz; *Sisymbrium linifolium* var. *decumbens* (Rydb.) O. E. Schulz] Perennial, glabrous and usually glaucous, arising from a simple or more usually branched caudex, this from a creeping, deeply placed rhizome, stems (1.5) 2-9 dm tall, erect or less commonly ascending to decumbent, simple or branched; leaves 1.3-9.3 cm long, 0.1-2.5 cm wide, entire to deeply pinnatifid, basal ones often deciduous by midanthesis; pedicels 2-9 (10) mm long in fruit, ascending to spreading; sepals 4.3-6 mm long, yellowish; petals 7.5-11 mm long, yellow, spreading; siliques 25-65 (75) mm long, 0.8-1.2 mm wide, terete, sessile, erect or ascending; styles 0.3-0.6 mm long. —Salt desert shrub, sagebrush, and piñon-juniper communities in Carbon, Daggett, Duchesne, Emery, Garfield (probable type location of *Schoenocrambe pinnata*), Grand, Kane, Sanpete, Sevier, Summit, Uintah, Wasatch, and Wayne counties, and probably elsewhere; British Columbia east to Montana and south to Nevada and New Mexico.

The indecision as to the generic position of this plant is indicated by the numerous generic names associated with it. The plants simulate *Sisymbrium* in a broad sense but do not show apparent relationship with the introduced annual or biennial weedy species of that genus. It seems best to place this plant within its own genus even though the principle diagnostic features involve vegetative instead of floral characteristics.

#### SISYMBRIUM L.

Plants glabrous or hirsute annuals or rarely biennials, arising from taproots; leaves alternate and basal, variously lobed to entire, lower ones usually pinnatifid, reduced upwards, petiolate to sessile, not auriculate; flowers racemose, pedicels spread-

ing to erect, not subtended by bracts; sepals 4, deciduous; petals 4, yellow; stamens 6, filaments lacking glandular processes; styles almost lacking, stigma bilobed; fruit a sessile silique many times longer than broad,

linear to tapering, terete, valves usually 3-nerved; seeds several to many, uniseriate.

A complex genus of perhaps 75 species in temperate regions of the Old World and South America.

- 1. Leaves strongly dimorphic, lower lyrate-pinnatifid, uppermost with linear-filiform lobes; pedicels ascending, siliques 50-90 mm long, spreading-ascending to erect, not appressed; petals 6.3-8.5 mm long ..... *P. altissimum*  
Leaves not dimorphic, upper and lower lobed about same; pedicels ascending to erect, siliques 10-45 mm long, erect or ascending, appressed or not; petals 2-4 mm long ..... 2
- 2(1). Siliques and pedicels ascending to spreading, not appressed to rachis, siliques (20) 25-45 mm long ..... *S. irio*  
Siliques and pedicels appressed-erect, siliques 10-15 mm long ..... *S. officinale*

*Sisymbrium altissimum* L. [*Norta altissima* Britton] Jim Hill Mustard; Tumbling Mustard. Annual, stems 2.5-10 dm tall or more, sparingly to densely hirsute near base, usually glabrous above; leaves 1-20 cm long or more, petiolate, lower ones pinnatifid or merely lobed, becoming pinnatifid into line-filiform segments upwardly; pedicels 4-10 mm long, stout, almost or quite as thick as the silique, ascending to spreading; sepals 3.6-5 mm long, often yellowish; petals 6.3-8.5 mm long, yellow, fading white, obovate to spatulate, spreading; siliques 50-90 mm long, 1-1.5 mm wide, terete, spreading to ascending, valves evidently 3-nerved. —Usually in open disturbed sites at lower and middle elevations in Cache, Davis, Duchesne, Emery, Iron, Juab, Kane, Millard, Piute, Salt Lake, San Juan, Tooele, Utah, Wasatch, Washington, Wayne, and Weber counties, and probably cosmopolitan; widespread in North America; adventive from Europe.

*Sisymbrium irio* L. [*Norta irio* (L.) Britton] Annual, stems 2-8 dm tall, erect, glabrous; leaves 1.5-10 (20) cm long, runcinate-pinnatifid to pinnatifid, reduced upwardly; pedicels 6-10 mm long, slender, ascending; sepals 2-2.5 (3) mm long, greenish or yellowish; petals 3-4 mm long, yellow, oblanceolate, spreading-ascending; siliques (20) 25-45 mm long, 0.8-1 mm wide, ascending. —Weed of dry sites in Beaver and Washington counties where locally common; California to Arizona; adventive from Europe.

*Sisymbrium officinale* (L.) Scop. [*Erysimum officinale* L.] Hedge Mustard. Annual, stems 2.5-8 dm tall or more, hispid-hirsute throughout; leaves 1.5-20 cm long or more, lyrate-pinnatifid to pinnatifid, not especially dimorphic, upper ones merely reduced; pedicels 2-3 mm long, stout, erect, tip about as thick as the silique; sepals 1.5-2.2 mm long, green or yellow; petals 3-4 mm long, yellow, fading white, narrowly oblanceolate, ascending; siliques 8-15 mm long, appressed-erect, tapering to beaklike tip, valves 3-nerved. —Uncommon weedy plant of disturbed sites in Utah County and to be expected elsewhere; widespread in North America; adventive from Europe.

SMELOWSKIA C. A. Meyer

Plants pubescent perennials, pulvinately cespitose, arising from a branching caudex, pubescence with branched and often with some simple hairs; leaves alternate or chiefly basal, usually pinnatifid, petiolate to sessile, not auriculate; flowers subcorymbose to racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, white, rarely purplish; stamens 6, filaments lacking glandular processes; styles prominent, stigma expanded; fruit a silique, 3- to several times longer than broad, subterete or compressed, valves 1-nerved; seeds few to several per locule.

A genus of perhaps four species of Asia and North America. *Smelowskia holmgrenii* Rollins clearly does not belong to this genus, and this Nevada endemic probably



ought to be placed in its own monotypic genus.

Drury, W. H., and R. C. Rollins. 1952. The North American representatives of *Smelowskia*. *Rhodora* 54:85-119.

*Smelowskia calycina* C. A. Meyer. Plants perennial, caespitose, with short to elongate caudex branches, these clothed with marcescent leaf bases; stems 0.4-2 dm tall, pubescent with short, branched and long, simple or branched hairs; basal leaves 0.5-5 cm long, 0.4-1.6 cm wide, pinnately divided; cauline leaves reduced upwardly; pedicels mostly 3-8 mm long in fruit, ascending to spreading-ascending, pubescent; sepals 2-3.2 mm long, often tinged purplish, pubescent; petals 3-8 mm long, white to cream or tinged pink to lavender, ovate, spreading; siliques 5-9 mm long, slightly flattened parallel to the septum or terete; styles 0.2-1 mm long; seeds 6-10. —Alpine tundra from 2900 to 3900 m elevation in Beaver, Daggett, Duchesne, Grand, Iron, Piute, Salt Lake, Uintah, and Utah counties; Alaska Yukon and Northwest Territories

south to Nevada, Utah, and Colorado. Our material is var. *americana* (Regel & Herd.) Drury & Rollins [*Hutchinsia calycina* var. *americana* Regel & Herd.; *S. americana* (Regel & Herd.) Rydb.; *S. lineariloba* Rydb.; *S. lineariloba* f. *virescens* O. E. Schulz].

STANLEYA L.

Perennial, glabrous to simple pubescent herbs or subshrubs, arising from taproots or caudices; leaves alternate and basal, pinnatifid to entire, petiolate to sessile, auriculate in some; flowers showy, racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, yellow to greenish-yellow; stamens 6, filaments lacking glandular processes, long-exserted; styles lacking to prominent, stigma small; fruit a long-stipitate siliqua, linear, terete to compressed, valves 1- or more-nerved; seeds numerous, uniseriate.

A western North American genus of seven species.

Rollins, R. C. 1939. The cruciferaceous genus *Stanleya*. *Lloydia* 2:109-127.

- 1. Middle and upper cauline leaves sessile, auriculate; leaves all entire; petal-claw glabrous on both surfaces ..... *S. viridiflora*  
Middle and upper cauline leaves petiolate to subsessile, not auriculate; leaves various; petal-claw pubescent on the inner or outer surfaces ..... 2
- 2(1). Leaves entire or merely toothed, basal ones ovate to elliptic, cauline ones ovate to lanceolate or oblanceolate; plants of east-central and northeastern Utah ..... *S. integrifolia*  
Leaves, at least some, pinnatifid, only upper ones entire and usually lanceolate to lance-linear; distribution various ..... 3
- 3(2). Plants woody at base, caudex well developed; blades of petals mostly 1-3 mm wide; our most common and widespread species of the genus ..... *S. pinnata*  
Plants herbaceous, caudex not developed; blades of petals 3-6 mm wide or more; an uncommon to rare plant of southeastern Utah ..... *S. albescens*

*Stanleya albescens* M. E. Jones. Biennial, caudex neither woody nor well developed; stems 2.5-10 dm tall, glabrous and glaucous, simple or branched; leaves mostly 5-15 cm long, 1-5 cm wide, lyrate-pinnatifid or upper ones reduced in size and subentire to entire, glabrous and glaucous; pedicels mostly 5-10 mm long, spreading, glabrous; sepals 10-15 mm long, white with green tips, glabrous, reflexed; petals 10-16 mm long, blade 3-6 mm wide or more, claw

hairy within; siliques 30-60 mm long, 1.5-2.5 mm wide, subterete, stipes 10-15 mm long. —Semidesert shrublands upwards to pinyon-juniper woodlands, to be expected in Grand or San Juan counties, not presently known from the state; Colorado and Arizona.

*Stanleya integrifolia* James. [*S. pinnatifida* var. *integrifolia* (James) B. L. Robinson; *S. glauca* var. *latifolia* Cockerell; *S. pinnata* var. *integrifolia* (James) Rollins] Perennial,

caudex well developed and more or less woody; stems 2.5-9 dm tall or more, sparingly hairy, glaucous, simple or branched; leaves 0.8-12.3 cm long, 0.3-3.5 cm wide, elliptic to ovate or lanceolate, all entire or lower ones merely toothed, puberulent, glaucous; sepals mostly 9-19 mm long, yellowish, reflexed, glabrous; petals 10.5-15.5 mm long, blade 1.4-2.6 mm wide, claw hairy within; siliques 33-75 mm long, 1.2-1.8 mm wide, subterete, stipes 10-25 mm long. —Clay soils in desert shrub and pinyon-juniper communities from 1530 to 2000 m elevation in Daggett, Duchesne, Emery, and Uintah counties; Utah and Wyoming eastward to Kansas.

Our material is distinctive and about equivalent in diagnostic features found among the other species of *Stanleya* in Utah.

*Stanleya pinnata* (Pursh) Britton. [*Cleome pinnata* Pursh; *S. pinnatifida* Nutt.; *S. heterophylla* Nutt. ex Torr. & Gray; *S. fruticosa* Nutt.; *S. arcuata* Rydb.; *S. canescens* Rydb.; *S. glauca* Rydb.] Prince's Plume. Perennial, caudex well developed and slightly to very woody; stems (2.5) 3.5-12 (15) dm tall or more, glabrous to pilose, glaucous, simple or branched; leaves mostly 5-18 cm long, 2-5 cm wide or more, lanceolate to elliptic in outline, pinnatifid or upper usually entire and narrowly lanceolate to elliptic, not auriculate, glabrous or sparsely pilose; pedicels 4-13 mm long, spreading; sepals 11-22 mm long, yellowish, reflexed, glabrous; petals 11-17 mm long, blade 1-3.8 mm wide, claw hairy within; siliques (30) 35-70 (80) mm long, 1.2-2 mm wide, subterete to flattened, stipes 12-24 mm long, puberulent at base. —Seleniferous soils derived from shales, mudstones, and siltstones in many geological formations, from 850 to 2900 m elevation in Beaver, Box Elder, Carbon, Emery, Garfield, Grand, Iron, Juab, Kane, Millard, San Juan, Sanpete, Sevier, Uintah, Utah, Washington, and Wayne counties; Idaho east to North Dakota south to California, Arizona, and New Mexico.

This plant is a primary indicator of the poisonous element selenium, because the plant is common in such soils. Our material

belongs to var. *pinnata*, but the var. *gibberosa* Rollins, known from Uinta County, Wyoming, is to be sought in Summit County, Utah. Its leaves are all bipinnate. The var. *ingoensis* (Munz & Roos) Reveal may be encountered in Washington County; it differs from var. *pinnata* in being a woody subshrub.

*Stanleya viridiflora* Nutt. ex Torr. & Gray. [*S. collina* M. E. Jones] Desert Plume. Perennial, caudex simple or branched, somewhat woody at base; stems 3-12 dm tall or more, glabrous and glaucous, simple or branched; leaves 7-30 cm long, basal ones 1.8-8.7 cm wide, petiolate, blades united or somewhat runcinate-pinnatifid, upper ones entire, sessile and auriculate, glabrous; pedicels mostly 6-12 mm long, spreading; sepals 11-20 mm long, yellow, reflexed, glabrous; petals 10-19 mm long, blade 0.8-1.5 (3) mm wide, not much wider than glabrous claw; siliques 35-70 mm long, subterete, stipe 14-25 mm long. —Gypsiferous or clay soils in sagebrush and pinyon-juniper communities from 1680 to 2450 m elevation in Duchesne, Emery, Salt Lake (?), Summit, Uintah, and Wayne counties; Idaho and Wyoming southwestwardly to Nevada and Oregon.

#### STREPTANTHELLA Rydb.

Plants glabrous, annual or winter annual, arising from taproots; leaves alternate, entire to shallowly dentate, tapering to base, not auriculate; flowers racemose, pedicels spreading-recurved to recurved, not subtended by bracts; sepals 4, deciduous; petals 4, white or purplish; stamens 6, the filaments lacking glandular processes; style obsolete, small capitate stigma borne atop a beaklike extension of fruit; fruit a subsessile, slender silique many times longer than broad, strongly compressed, valves 1-nerved, dehiscent at base only; seeds several to many per locule, uniseriate.

A monotypic genus of western North America.

*Streptanthella longirostris* (S. Wats.) Rydb. [*Arabis longirostris* S. Wats.; *Streptanthus longirostris* (S. Wats.) S. Wats.; *Euklisia longirostris* (S. Wats.) Rydb.; *Thelypodium longirostris* (S. Wats.) Jepson] Annual,

stems erect or ascending, usually branched throughout, 1-5 dm tall; leaves 1.5-8.5 cm long, 0.1-1.2 cm wide, oblanceolate to elliptic or lance-linear, sinuate-dentate to entire, lower ones usually deciduous by anthesis, reduced upwardly; pedicels 1.5-6 mm long, curved in fruit; sepals 2-4.8 mm long, greenish or purplish, with scarious margins; petals 5-8 mm long, white with purplish veins; siliques 30-60 mm long, 1.5-2 mm wide, reflexed-descending, valves narrowed apically into an indehiscent beak 3-7 mm long; style obsolete. —Sandy, clayey, or gravelly soils in desert shrub, pinyon-juniper, and low elevation grassland communities from 900 to 1900 m elevation in Beaver, Carbon, Emery, Garfield, Grand, Kane, Millard, San Juan, Sevier, Uintah, Washington, and Wayne counties; Washington east to Wyoming and southward to Baja California and New Mexico.

#### STREPTANTHUS Nutt.

Plants glabrous, perennial, arising from taproots, rarely rhizomatous; leaves alternate and basal, simple, dentate to entire, basal ones petiolate, upper ones becoming sessile, entire, and auriculate upwardly; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, chestnut to brown-purple or purple; stamens 6, often in 3 pairs as regards length and position, filaments lacking glandular processes; styles conspicuous, expanded, stigma bilobed; fruit a short-stipitate silique many times longer than broad, much flattened, valves with one main nerve and more or less reticulate lateral nerves; seeds several to many per locule, uniseriate.

A genus of perhaps 25 species of the western United States.

*Streptanthus cordatus* Nutt. ex Torr. & Gray. [*Euklisia cordata* (Nutt.) Rydb.; *Carteria cordata* (Nutt.) Greene; *S. crassifolia* Greene] Perennial, stems not inflated, 1.8-5.7 (8) dm tall, glabrous and glaucous; basal leaves 1.5-8 (15) cm long, 0.5-2 (5) cm wide, spatulate to obovoid or oblanceolate, variously dentate, often sharply ciliate at least basally; cauline leaves becoming sessile and auriculate, ovate to oval or lanceolate;

pedicels 4-9 mm long, ascending, glabrous; sepals (5) 7-10.5 mm long, usually purplish, glabrous except apically; petals 10-14.5 mm long, purple to chestnut, broad claw not constricted at juncture of blade, ascending to recurved; siliques 50-85 mm long, 3-5.8 mm wide, ascending to erect, glabrous; styles 1-3 mm long, expanded upwards, the stigma bilobed. —Sagebrush and pinyon-juniper communities from 1200 to 2600 m elevation in most of the counties of Utah; Oregon to Wyoming south to California, Arizona, and New Mexico.

A specimen collected near Kanosh, Millard County, by Pickford (130-OGDF) is definitely rhizomatous.

#### THELYPODIOPSIS Rydb.

Plants glabrous or pubescent with simple hairs, annual or biennial to perennial, arising from taproots; leaves alternate or alternate and basal, simple, oblong-oblanceolate to lanceolate or ovate, toothed to entire, petiolate or sessile and auriculate or merely sessile; flowers in racemes, pedicels ascending or spreading-ascending, not subtended by bracts except in some lowermost flowers; sepals 4, deciduous; petals 4, white, pink, lavender, or yellow; stamens 6, filaments lacking processes; style expanded upwards, stigma bilobed; fruit a sessile to stipitate silique, many times longer than broad, subterete to terete, valves 1 (3-5)-nerved; seeds uniseriate.

A genus of western United States and perhaps northern Mexico of perhaps seven species.

The species included herein have been treated as members of *Streptanthus*, *Thelypodium*, an expanded *Sisymbrium*, and even *Caulanthus*. The generic problem has been reviewed by Al-Shebaz (1973; see *Thelypodium*), but the solution adopted by that author, and followed in part here, is not altogether acceptable for our species. We have placed the wholly discordant *Caulanthus divaricatus* Rollins in *Thelypodopsis*, and as *Thelypodium sagittatum* mirrors both *Thelypodopsis elegans* and *T. ambigua* that entity might well be placed in the latter genus also.

1. Leaves merely sessile, not auriculate, all cauline; plants perennial, from a branching caudex ..... *T. argillacea*  
 Leaves auriculate, at least the cauline; plants biennial or winter annual ..... 2
- 2(1). Petals yellow ..... 3  
 Petals pink, lavender, or white ..... 4
- 3(2). Pedicels, sepals, and siliques glabrous; petal blade not especially constricted at juncture with petaloid claw ..... *T. aurea*  
 Pedicels, sepals, and siliques sparingly villous; petal blade conspicuously constricted at juncture with broadened membranous claw ..... *T. divaricata*
- 4(2). Pedicels, sepals, and siliques glabrous; basal leaves often over 6 times longer than broad; plants known from Kane County ..... *T. ambigua*  
 Pedicels, sepals, and siliques sparingly villous; basal leaves usually less than 5 times longer than broad; plants of eastern Utah ..... *T. elegans*

*Thelypodopsis ambigua* (S. Wats.) Al-Shebazz. (*Thelypodium ambiguum* S. Wats.). Biennial or short-lived perennial, stems not inflated, 2-10 (12.5) dm tall, glabrous throughout; leaves basal and cauline, basal ones 3-15 (20) cm long, 0.6-2.8 cm wide, sinuate-dentate to entire, cauline ones reduced upwards, becoming entire and lanceolate to lanceolate, 0.5-5.5 cm long, 0.3-1.8 cm wide, sessile and auriculate; pedicels 4-12 cm long, curved-ascending to spreading-ascending, glabrous; sepals 5-7 mm long, often pinkish-hyaline, glabrous, erect; petals 9-12 mm long, blade 3-4 mm wide, pink to lavender or white, claw broad, slightly constricted at juncture of blade; anthers 2.5-3.5 mm long; siliques 55-75 mm long, 1.2-2 mm wide, short-stipitate, terete, ascending to erect; styles 1-2.5 mm long, expanded upwards, stigmatic lobes developed. —Clay to sandy and gravelly soils in pinyon-juniper community from 1530 to 1830 m elevation in Kane (Eastwood & Howell 9300—US; Welsh & Atwood 9706—BRY) and Washington (Palmer 27, southern Utah, 1877—US) counties; Mohave County, Arizona.

*Thelypodopsis argillacea* Welsh & Atwood. Plants perennial, glabrous, glaucous; stems 1.3-3 dm tall, simple or branched above, arising from a subliguous caudex; leaves sessile, all cauline, not auriculate, linear, 0.9-3 cm long, 0.8-2 mm wide, somewhat fleshy, entire, acute to rounded; racemes (5) 8- to 22-flowered; pedicels 7-13 mm long, ascending; sepals 4.2-6.5 mm long, purplish, margins hyaline; petals 7.8-

10.9 mm long, 2.5-3.2 mm wide, white to lilac, with conspicuous purplish veins, claw not differentiated from the blade; anthers 1.7-2.5 mm long; siliques 18-25 mm long, 1-1.2 mm wide, subsessile, terete, ascending to erect; styles 0.5-1 mm long, expanded upwards, stigmatic lobes developed. Desert shrublands on Green River Shale, at lower elevations in Uintah County; endemic.

*Thelypodopsis aurea* (Eastw.) Rydb. [*Thelypodium aureum* Eastw.; *Sisymbrium aureum* (Eastw.) Payson] Biennial or rarely short-lived perennial, stems not inflated, 1-7 dm tall, glabrous throughout or somewhat pubescent below with flattened, flexuous hairs; leaves basal and cauline, basal ones 2.5-6.5 cm long, 0.5-1.3 cm wide, irregularly toothed to subentire, cauline ones reduced upwardly, becoming entire and lanceolate to ovate-lanceolate, 1.3-6.5 cm long, 0.4-2.3 cm wide, sessile and auriculate; pedicels 5-9 mm long, spreading-ascending, glabrous; sepals 5-9.3 mm long, yellowish, glabrous, ascending; petals 6.9-12.5 mm long, blade not expanded, 1.5-3.5 mm wide, yellowish, claw very broad, ascending limb not especially constricted at juncture with claw; anthers 2.7-3.7 mm long; siliques 40-70 mm long, 1-1.5 mm wide, stipitate, stipe 2-7 mm long, terete, ascending to erect, glabrous; styles 1-3 mm long, expanded upwards, stigmatic lobes well developed. —Clay to sandy soils in semidesert shrub and pinyon-juniper communities from 1500 to 2450 m elevation in San Juan County; Colorado.



*Thelypodopsis divaricata* (Rollins) Welsh & Reveal, comb. nov., based on *Caulanthus divaricatus* Rollins, Contr. Gray Herb. 201: 8. 1971. Biennial or winter annual, erect, simple, stems not inflated, 2-11 dm tall, herbage more or less pubescent with long, tangled hairs at least below; leaves basal and cauline, basal ones 1.5-10 cm long, 0.4-2.8 cm wide, irregularly toothed or rarely pinnatifid, subentire or dentate at apex only, cauline ones reduced upwardly, becoming entire and ovate-lanceolate, 0.7-9 cm long, 0.4-2.8 cm wide, sessile and auriculate; pedicels 5-21 mm long, spreading-ascending, sparingly villous to glabrate; sepals (3.5) 4.8-7 mm long, yellowish, sparingly villous; petals 7-10 mm long, yellowish, claw very broad, ascending limb constricted at juncture with claw; anthers 2.5-3.8 mm long; siliques 40-80 (90) mm long, 1-1.5 mm wide, sessile or subsessile, terete, ascending to erect, sparingly villous when young, becoming glabrous with age; styles 1-2 mm long, with stigma reduced or expanded and lobes not or only moderately well developed. — Clay soils in shadscale, blackbrush, and pinyon-juniper communities from 1280 to 1700 m elevation in Carbon, Emery, Garfield, Grand, San Juan, and Wayne counties; endemic.

*Thelypodopsis elegans* (M. E. Jones) Rydb. [*Thelypodium elegans* M. E. Jones; *Sisymbrium elegans* (M. E. Jones) Payson; *Streptanthus wyomingensis* A. Nels.; *Thelypodopsis wyomingensis* (A. Nels.) Rydb.] Biennial or rarely a winter annual or a short-lived perennial, stems 1.2-9.5 dm tall, almost or quite glabrous to densely pubescent below with flattened, flexuous hairs; leaves basal and cauline, basal ones 1-6.5 cm long, 0.3-1.5 cm wide, sinuate-dentate to irregularly toothed or entire, cauline ones reduced upwardly, becoming entire and lanceolate to ovate-lanceolate or oblong, 0.3-8.5 (12) cm long, 0.3-2 cm wide, sessile and auriculate; pedicels 5-18 mm long, curved-ascending to spreading-ascending, glabrous or sparingly villous, erect; petals 11-14.5 mm long, blade 3-6 mm wide, pink to lav-

ender or white with pinkish veins, claw very broad, not constricted at juncture with blade; anthers 2.6-3.2 mm long; siliques 45-75 mm long, 1.2-1.8 mm wide, sessile or subsessile, terete, ascending to erect, glabrous or sparingly villous; styles 1.8-3 mm long, expanded upwards, stigmatic lobes well developed. — Clay, sandy, or gravelly soils in pinyon-juniper, sagebrush, and desert shrub communities from 1500 to 2300 m elevation in Duchesne, Grand, and Uintah counties; Wyoming, Colorado.

It has not been possible to segregate *T. wyomingensis* from the bulk of *T. elegans*, and that species is hereby reduced to synonymy.

#### THELYPODIUM Endl.

Plants glabrous or pubescent with simple hairs, annuals, biennials, or short-lived perennials, arising from taproots; leaves alternate and basal, simple, lyrate-pinnatifid, toothed or entire, petiolate or sessile, auriculate in some; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, white, pink, lavender, or purple; stamens 6, filaments lacking glandular processes; styles slender to stout, cylindric to somewhat expanded upwards, stigmas small, entire or somewhat bilobed; fruit a stipitate silique many times longer than broad, terete or somewhat flattened, valves 1 (3)-nerved; seeds uniseriate.

A genus of about 10 species of western North America.

*Pennellia micrantha* (A. Gray) Nieuwl. [*Thelypodium micranthum* (A. Gray) S. Wats.; *Heterothrix micrantha* (A. Gray) Rydb.] has been repeatedly reported from Utah, but we have failed to find any specimens definitely known from the state in any of the herbaria we have consulted. It differs from the species of *Thelypodium* reported here in having stellately pubescent leaves.

Al-Shebaz, I. A. 1973. The biosystematics of the genus *Thelypodium* (Cruciferae). Contr. Gray Herb. 204 :3-148.

Payson, E. B. 1922. A monographic study of *Thelypodium* and its immediate allies. Ann. Missouri Bot. Gard. 9: 233-324.

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|--|---|
| 1. Cauline leaves definitely auriculate .....                | 2 |
| Cauline leaves petiolate or sessile but not auriculate ..... | 3 |



- 2(1). Cauline leaves linear to oblong or oblong-lanceolate, appressed to stem; basal leaves 1-7 cm long, 0.4-1.8 cm wide ..... *T. rollinsii*  
Cauline leaves oblong to lanceolate, not appressed to stem; basal leaves 6-20 cm long, 0.6-5 cm wide ..... *T. sagittatum*
- 3(1). Plants robust biennials, mostly 5-15 dm tall or more; racemes borne in corymbose panicles ..... *T. integrifolium*  
Plants various, but if (as rarely) as above, then racemes seldom if ever borne in corymbose panicles ..... 4
- 4(3). Racemes mostly 1-8 dm long or more; petals 8 mm long or more, differentiated into a blade and claw; plants known only from Box Elder County ..... *T. millefolium*  
Racemes mostly less than 1 dm long; petals 4-8 mm long, hardly differentiated into a blade and claw; plants not of Box Elder County ..... 5
- 5(4). Sepals ascending to spreading; petals 1.5-3.5 mm wide; eastern Utah ..... *T. laxiflorum*  
Sepals spreading to reflexed; petals 1-2 mm wide; Henry Mountains, Garfield County ..... *T. wrightii*

*Thelypodium integrifolium* (Nutt.) Endl.  
Biennial, stems mostly 5-30 dm tall, simple or branched, glabrous and glaucous; basal leaves 5-30 cm long, 1.5-10 cm wide or more, spatulate to lanceolate, ovate or obovate, entire to denticulate; cauline leaves 2-12 (15) cm long, 0.2-2 cm wide, oblanceolate to elliptic or lanceolate, sessile, not auriculate; pedicels 3-10 mm long, variously spreading, strongly to moderately flattened at base; sepals 3-7 mm long, often purplish,

glabrous; petals 5-10 mm long, mostly 1-2 mm wide, white to lavender or purple; anthers 1-3 mm long; siliques 10-45 mm long, 1-2 mm wide, stipitate, stipes up to 2 mm long; styles slender, 0.5-3 mm long; stigma entire. —Widespread at the lower elevations in Utah; common throughout much of the American West.

Four more or less distinctive varieties are known.

- 1. Mature fruiting pedicels whitish, stout; flowers white; plants of southwestern Utah ..... *T. integrifolium* var. *affine*  
Mature fruiting pedicels not whitish or only seldom so, slender or stout; flowers pink to lavender or white; plants not of southwestern Utah ..... 2
- 2(1). Mature fruiting pedicels not or only somewhat flattened at base; plants mostly of south-central to north-central Utah ..... *T. integrifolium* var. *integrifolium*  
Mature fruiting pedicels strongly flattened at base; plants of eastern and southeastern or northwestern Utah ..... 3
- 3(2). Racemes mostly 1-8 cm long in fruit; stipes often less than 1 mm long; plants of northwestern Utah ..... *T. integrifolium* var. *complanatum*  
Racemes mostly more than 8 cm long in fruit; stipes often more than 1 mm long; plants of eastern and southeastern Utah ..... *T. integrifolium* var. *gracilipes*

Var. *affine* (Greene) Welsh & Reveal, comb. nov., based on *Thelypodium affine* Greene, Pittonia 4:314. 1901. [*T. rhomboideum* Greene; *Pleurophragma rhomboideum* (Greene) O. E. Schulz; *T. integrifolium* ssp. *affine* (Greene) Al-Shebaz]. Saline seeps,

springs, irrigation canals, and stream sides from 850 to 1100 m elevation in Kane, Mil-lard, and Washington counties; Nevada, California.

Var. *complanatum* (Al-Shebaz) Welsh & Reveal. [*T. integrifolium* ssp. *complanatum*

Al-Shebazz]. Uncommon, at lower elevations in Beaver and Box Elder counties; Utah westward to California and Oregon.

Var. *gracilipes* B. L. Robinson. [*T. gracilipes* (B. L. Robinson) Rydb.; *Pleurophragma gracilipes* (B. L. Robinson) Rydb.; *P. platypodium* Rydb., the type is from Moab; *T. rhomboideum* var. *gracilipes* (B. L. Robinson) Payson; *T. integrifolium* ssp. *gracilipes* (B. L. Robinson) Al-Shebazz]. Canyon bottoms, terraces, and hanging gardens at low elevations in Garfield, Grand, Kane, San Juan, Uintah, and Wayne counties; Arizona, Colorado, and New Mexico.

Var. *integrifolium*. [*Pachypodium integrifolium* Nutt. ex Torr. & Gray; *T. lilacinum* Greene; *Pleurophragma integrifolium* (Nutt.) Rydb.; *Pleurophragma lilacinum* (Greene) Rydb.; *T. lilacinum* var. *subumbellatum* Payson]. Marshes, seeps, stream sides, and other moist sites in Cache, Iron, Piute, Salt Lake, Sevier, and Utah counties; Washington east to the Dakotas and south to Oregon, Utah, Colorado, and Nebraska.

*Thelypodium laxiflorum* Al-Shebazz [*T. wrightii* var. *tenellum* M. E. Jones; *Stanleyella wrightii* var. *tenella* (M. E. Jones) Payson] Biennial, stems 1.5-15 dm tall or more, simple, glabrous throughout or hispid near base; basal leaves 3-15 cm long, 1-6 cm wide, pinnatifid to toothed; cauline leaves 3-9 cm long, 0.2-2 cm wide, subentire to entire, not auriculate; pedicels 4-13 mm long, spreading to descending, somewhat flattened at base; sepals 2.5-6 mm long, white to lavender, glabrous ascending to spreading; petals 4-8 mm long, 1.5-3.5 mm wide, white to lavender; anthers 1-3 mm long; siliques 20-75 mm long, 0.8-1.2 mm wide, stipitate, stipes 0.2-2 mm long; styles 0.5-2 mm long. —Mountain brush and forest communities from 1700 to 2450 m elevation in Carbon, Duchesne, Iron, Kane, San Juan, Utah (type from Slate Canyon), and Washington counties; Nevada to Colorado.

Closely related to *T. wrightii*.

*Thelypodium milleflorum* A. Nels. [*T. laciniatum* var. *milleflorum* (A. Nels.) Payson] Biennial, stems mostly 4-12 dm tall, almost always hollow, simple or branched, glabrous and glaucous; basal leaves 6-15 cm long, 1-7

cm wide, oblong to lanceolate or ovate, toothed or pinnatifid; cauline leaves similar to the basal ones only gradually reduced upwardly, petiolate, not auriculate; pedicels 2-6 mm long, curved-ascending, slightly flattened at base; sepals 4-9 mm long, creamy-white, glabrous; petals 8-15 mm long, 1-2 mm wide, white; anthers 2.5-5 mm long; siliques 25-85 mm long, 0.8-1.8 mm wide, stipitate, stipes 0.5-5 mm long; styles stout, 0.5-2 mm long; stigma entire. —Dry slopes and saline flats in Box Elder County; British Columbia south to California and east to Idaho and Utah.

*Thelypodium rollinsii* Al-Shebazz. Biennial, the stems (4) 5-16 (20) dm tall, simple or branched, glabrous and glaucous; basal leaves 1.3-7 cm long, 0.4-1.8 cm wide, spatulate to oblanceolate, toothed to subentire; cauline leaves 1-6 cm long, 0.1-0.8 cm wide, linear to narrowly lanceolate or oblong, erect, not flattened; sepals 4-7 mm long, lavender to purplish, glabrous; petals 6-10 mm long, 1.2-3 mm wide, lavender to purplish; anthers 2-4 mm long; siliques 20-60 mm long, 0.7-1 mm wide, stipitate, stipe 0.5-6 mm long; styles 0.5-2 mm long; stigma entire. —Stream terraces, saline flats, and seeps in greasewood and saltgrass communities from 1370 to 1700 m elevation in Carbon, Juab, Millard, Piute, Sanpete, and Sevier counties; endemic.

*Thelypodium sagittatum* (Nutt.) Endl. in Walpers. Biennial or short-lived perennial, stems 2-10 dm tall, rarely more, simple or more usually branched, glabrous or hirsute with simple hairs below; basal leaves 2-25 cm long, 1-5 cm wide, ovate to oblanceolate or oblong, entire; cauline leaves 0.7-10 (14) cm long, 0.2-2.8 cm wide, ovate to lanceolate or lance-oblong, entire, glabrous or puberulent especially on the veins, auriculate; pedicels 2.5-15 (20) mm long, spreading to spreading-ascending; sepals 2.5-10 mm long, green to purplish, glabrous; petals 5-15 mm long, 1-4 mm wide, white to lavender or purple; anthers 1.5-5 mm long; siliques 10-65 mm long, 0.5-1.2 mm wide, stipitate, stipes 0.3-2 mm long; styles 0.5-3 mm long. —Widespread in the state; Washington south to California and eastward to Montana and Wyoming.

This species simulates *Thelypodopsis elegans* in some features and care should be taken in distinguishing the two. The species

is divisible into three more or less distinctive varieties in Utah.

1. Petals linear to oblanceolate, 1.5 mm wide or less; pedicels 2.5-9 mm long; plants of southwestern Utah ..... *T. sagittatum* var. *ovalifolium*  
 Petals oblanceolate to spatulate, 1-4 mm wide; pedicels 5-15 mm long or more; distribution various ..... 2
- 2(1). Petals pink to lavender or purplish, or white fading lavender to purplish or white; siliques straight to curved, not or only slightly torulose .....  
 ..... *T. sagittatum* var. *sagittatum*  
 Petals white to pink, fading yellowish on drying; siliques flexuous-contorted and definitely torulose, wormlike ..... *T. sagittatum* var. *vermicularis*

**Var. *ovalifolium*** (Rydb.) Welsh & Reveal. [*T. ovalifolium* Rydb., type from Panguitch Lake; *T. palmeri* Rydb., type from southern Utah; *T. sagittatum* ssp. *ovalifolium* (Rydb.) Al-Shebaz]. Clay soils in Garfield, Iron, and Kane counties; Nevada.

**Var. *sagittatum***. [*Streptanthus sagittatus* Nutt.; *Pachypodium sagittatum* (Nutt.) Nutt. ex Torr. & Gray; *T. nuttallii* S. Wats.; *T. amplifolium* Greene; *T. torulosum* Heller; *T. macropetalum* Rydb., type from Davis County; *Thelypodopsis nuttallii* (S. Wats.) O. E. Schulz; *Thelypodopsis torulosa* (Heller) O. E. Schulz]. Clay or silty, often saline, soils from 1200 to 2300 m elevation in Box Elder, Cache, Davis, Duchesne, Salt Lake, Summit, Tooele, Utah, and Wayne counties; Washington and Montana south to Nevada, Utah, and Colorado.

**Var. *vermicularis*** Welsh & Reveal, var. nov. A *Thelypodio sagittato* var. *sagittato* petalis discoloriter flavidis et siliquis flexuosis et torulosis differt. Holotype: Utah: Sevier County, about 4 miles southeast of Sigurd along Utah Highway 24, on the Arapien Shale Formation in a greasewood community, 29 May 1972, Welsh & Atwood 11718. Holotypus, BRY. Paratypes: Utah: Box Elder County, Grouse Creek, 27 May 1973, *Albee* 1355; Juab County Fish Springs Range, 9 May 1968, Reveal & Thomas 984 (BRY, US); Millard County, west of Hinckley, 19 Apr 1930, *Cottam* 4622; 2 miles south of Black Rock Station, 14 May 1968, *R. C. Holmgren* 534; Sevier County, Glenwood, 18 May 1875, *Ward* s.n. (US); Utah County, Coyote Pass, 1.2 mile west of

Utah Highway 68, 15 May 1968, *Weston* 71 (all BRY unless otherwise indicated); endemic to Utah.

***Thelypodium wrightii*** A. Gray. [*Stanleyella wrightii* (A. Gray) Rydb.] Biennial, stems 1.5-10 dm tall or more, simple or more commonly branched, glabrous throughout or hispid near the base; basal leaves 3-15 cm long, 1-6 cm wide, pinnatifid to lyrate-pinnatifid; cauline leaves 3-9 cm long, 0.2-2 cm wide, pinnatifid to sinuate-dentate, rarely subentire, not auriculate; pedicels 4-13 mm long, spreading to descending, somewhat flattened at base; sepals 2.5-6 mm long, white to lavender, glabrous, spreading to reflexed; petals 4-8 mm long, 1-2 mm wide, white to lavender; anthers 1-3 mm long; siliques 20-75 mm long, 1-1.5 mm wide, stipitate, stipes 0.2-2 mm long; styles 0.5-1 mm long. —Rare and isolated in Utah well away from the bulk of range of this species, known only from a M. E. Jones collection from the Henry Mountains, Garfield County; Colorado and Arizona eastward to Texas and northern Mexico.

#### THLASPI L.

Plants glabrous, annual or perennial, arising from taproots; leaves cauline or cauline and basal, alternate, simple, entire to dentate or lobed; flowers racemose, pedicels not subtended by bracts; sepals 4, deciduous; petals 4, white, sometimes pinkish or lavender; stamens 6, filaments lacking glandular processes; fruit a sessile silicle, compressed contrary to septum, often more or less wing-margined; style obsolete or

slender and conspicuous, stigma capitate; seeds 2 to several per locule, uniseriate.

A genus of perhaps 50 species, mostly of Eurasia.

Holmgren, P. K. 1971. A biosystematic study of North American *Thlaspi* mon-

*tanum* and its allies. Mem. New York Bot. Gard. 21:1-106.

Payson, E. B. 1926. The genus *Thlaspi* in North America. Univ. Wyoming Publ. Bot. 1:145-186.

1. Plants annual; styles obsolete or up to 0.2 mm long; fruit orbicular in outline, conspicuously winged ..... *T. arvense*
- Plants perennial; styles 0.3-2.5 mm long or more; fruit oblanceolate to obcordate or obovate in outline, narrowly wing-margined or not winged at all ....  
..... *T. montanum*

*Thlaspi arvense* L. Annual, stems mostly 1-7 dm tall; basal leaves usually deciduous by anthesis; cauline leaves 1-8 cm long, 0.2-2.5 cm wide, elliptic to lanceolate or oblanceolate, sinuate-dentate to pinnatifid or subentire, uppermost sessile and auriculate; pedicels 5-12 mm long or more, spreading to curved-ascending; sepals 1.5-2.5 mm long, green with whitish margins; petals 3-4.5 mm long, white; silicles 10-17 mm long, 7-12 mm wide, strongly compressed, wing-margined all around; styles almost obsolete. —Weedy species of roadsides, meadows, fields, and other disturbed places from 1370 to 2450 m elevation in Box Elder, Cache, Davis, Grand, Rich, Salt Lake, Utah, Wasatch, and Weber counties, and to be expected elsewhere; widespread in North America; adventive from Europe.

*Thlaspi montanum* L. [*T. alpestre* of authors, not L.; *T. cochleariforme* DC.; *T. nuttallii* Rydb.; *T. alpestre* var. *glaucum* A. Nels.; *T. glaucum* (A. Nels.) A. Nels.; *T. coloradoense* Rydb.; *T. purpurascens* Rydb.; *T. alpestre* var. *purpurascens* (Rydb.) Ostenf.; *T. glaucum* var. *pedunculatum* Payson; *T. glaucum* var. *hesperium* Payson; *T. hesperium* (Payson) G. N. Jones; *T. fendleri* var. *coloradoense* (Rydb.) Maguire; *T. fendleri* var. *tenuipes* Maguire, type from Sanpete County; *T. fendleri* var. *hesperium* (Payson) C. L. Hitchc.] Perennial, with simple or branched caudex branches, stems 0.2-4 dm tall; basal leaves 0.9-3.5 cm long or more, 0.2-1 (1.5) cm wide, oval to oblong or spatulate-oblanceolate; cauline leaves 0.5-2.5 cm long, 0.1-1.2 cm wide, sessile and auriculate; pedicels 2-15 mm long, spreading or spreading-ascending; sepals 1.5-3.5

mm long, greenish to purplish; petals 3.5-7.5 mm long, white, pinkish or lavender, spatulate; silicles 3-8 mm long, rarely more, 1.5-5 mm wide, obovate to obcordate, winged or not so; styles 0.5-2.5 mm long. —Forest, krumholz, and alpine tundra communities from 2150 to 3965 m elevation in Beaver, Box Elder, Davis, Daggett, Duchesne, Emery, Garfield, Grand, Iron, Kane, Piute, Salt Lake, San Juan, Sanpete, Sevier, Summit, Tooele, Uintah, Utah, Wasatch, Washington, and Weber counties; Washington east to Montana and south to California, Arizona, New Mexico, and Texas; Eurasia.

Our material belongs to var. *montanum*. Some specimens from the southern part of the state approach the more southern var. *fendleri* (A. Gray) P. K. Holmgren, which has styles longer than 2.5 mm in length, petals 6-13 mm long, and silicles 7-16 mm long and 4-9 mm wide.

#### THYSANOCARPUS Hook.

Plants glabrous or pubescent with simple hairs, annual, arising from taproots; leaves cauline, alternate, simple, oblong-lanceolate to linear, toothed to entire; flowers racemose, pedicels recurved and not subtended by bracts; sepals 4, deciduous; petals 4, white or tinged pink or purple; stamens 6, the filaments lacking glandular processes; fruit a strongly compressed, unilocular, 1-seeded, indehiscent silicle, margin winged.

About 5 species of western North America.

*Thysanocarpus curvipes* Hook. Annual, stems 1-5 dm tall or more, simple or branched, sometimes hirsute below, other-

wise glabrous; leaves 1.2-5 cm long, 0.1-1 cm wide, lance-oblong to elliptic or linear, sinuate-dentate to entire, transitional upwards to smaller sessile and auriculate blades; pedicels 3-7 mm long, recurved in fruit; sepals 1-1.5 mm long, often purplish; petals 1.5-2 mm long, white or tinged purplish or pinkish; silicles 4.5-8 mm long, 3-4 mm wide, ovate to obovate, often plano-convex, glabrous or pubescent, wing crenate and sometimes perforate; styles 0.4-0.6 mm long. —Sand and gravelly soils in the warm desert shrub communities from 670 to 975 m elevation in Washington County; British Columbia south to California and eastward to Utah and Arizona.

Our material belongs to var. *eradiatus* Jepson.

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INDEX

Alyssum	latifolia, 296	furcatipilis, 295
alyssioides, 289	cobrensis	glabra, 295
desertorum, 289	confinis, 292	gracilentia, 298
incanum, 302	brachycarpa, 292	hirsuta, 295
ludovicianum, 339	confinis, 293	glabrata, 295
maritimum, 342	interposita, 293	ovata, 296
minus, 289	connexa, 294	pyncocarpa, 296
saxatile, 289	consanguinea, 296	holboellii, 296
szowitsianum, 289	dacotica, 292	fendleri
Anastatica	demissa, 293	pinetorum, 296
syriaca, 327	demissa, 294	retrofracta, 296
Arabidopsis	lanugida, 294	secunda, 296
stenocarpa, 327	russeola, 294	interposita
thaliana, 290	densa, 297	kochii, 296
virgata, 327	densicaulis, 298	latifolia, 296
Arabis	diehlII, 298	lemmonii, 296
albertina, 294	dicaricarpa, 292	lemmonii, 297
angulata, 299	drummondii, 294	lignifera, 297
aprica, 293	alpina, 297	lignipes, 296
arcuata,	brachycarpa, 292	impar, 299
perennans, 298	connexa, 294	longirostris, 352
secunda, 296	lyallii, 297	lyallii, 297
subvillosa, 301	oreophila, 297	lyallii, 297
arida, 299	oxyphylla, 294	macdougalii, 296
arnerifolia, 297	pratincta, 292	macella, 298
beckwithii, 299	egglestonii, 296	macounii, 298
brachycarpa, 292	eremophila, 298	macrocarpa
bracteolata, 296	exilis, 296	microphylla, 297
brebneriana, 327	fendleri, 294	macounii, 298
brevisiliqua, 292	fendleri, 295	microphylla, 298
bridgeri, 298	spatifolia, 295	multiceps, 297
caduca, 296	formosa, 300	nemophila, 292
canescens, 296	glabra, 295	nevadensis, 298